

Henry J. Bigelow





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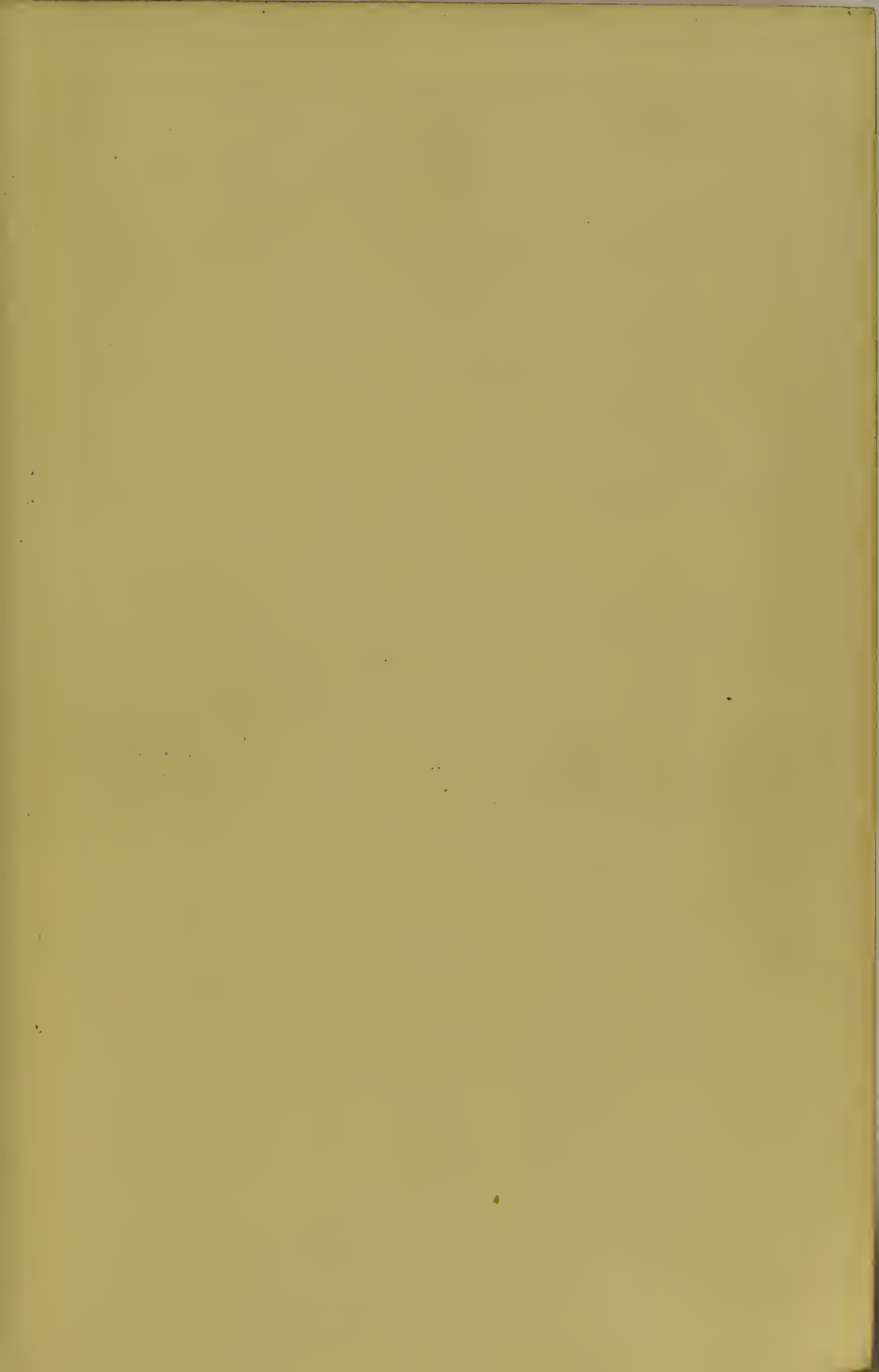
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HENRY J. BIGELOW,

FROM A PHOTOGRAPH BY ARTHUR DEXTER, ESQ.,  
TAKEN IN 1888.





A MEMOIR  
OF  
HENRY JACOB BIGELOW

A.M., M.D., LL.D.

MEMBER OF THE MASSACHUSETTS MEDICAL SOCIETY; EMERITUS PROFESSOR OF SURGERY IN HARVARD UNIVERSITY; SURGEON OF THE MASSACHUSETTS GENERAL HOSPITAL; MEMBER OF THE AMERICAN ACADEMY OF ARTS AND SCIENCES; MEMBER OF THE BOSTON SOCIETY FOR MEDICAL IMPROVEMENT; MEMBER OF THE BOSTON SOCIETY OF NATURAL HISTORY;  
FOREIGN HONORARY MEMBER OF THE CLINICAL SOCIETY OF LONDON; MEMBRE CORRESPONDANT ÉTRANGER DE LA SOCIÉTÉ DE CHIRURGIE DE PARIS; MEMBRE HONORAIRE DE LA SOCIÉTÉ ANATOMIQUE DE PARIS; MEMBRE CORRESPONDANT DE LA SOCIÉTÉ BIOLOGIQUE DE PARIS; SOCIUS EXTRANEUS SOCIETATIS MEDICÆ NORVEGICÆ; ETC., ETC.



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PORTRAITS OF DR. BIGELOW.

FROM A PHOTOGRAPH BY ARTHUR DEXTER, ESQ.,  
 TAKEN IN 1888 . . . . . *Frontispiece.*

FROM A DAGUERREOTYPE BY LÉON FOUCAULT, PARIS,  
 TAKEN IN 1841 . . . . . *Facing page 18.*

FROM A PHOTOGRAPH TAKEN ABOUT 1872 . . . *Facing page 136.*



THE medical profession and the friends of Dr. BIGELOW are indebted for the following Memoir to those who, by their addresses at society meetings, by written monographs, or by interviews, contributed to the universal expression of admiration and respect which followed the death of their distinguished associate.

The vigorous biographical memoir by Professor Oliver Wendell Holmes, the graphic sketches by Professor R. H. Fitz, Dr. A. T. Cabot, and Mr. Henry Lee, the reminiscences of Dr. H. Derby, Dr. H. H. A. Beach, and other closely allied personal friends, have been drawn from *verbatim* for this sketch of the striking incidents and varied attainments which make the life of this great surgeon and teacher pre-eminent among those of his fellow-men.

BOSTON, 1894.



## HENRY JACOB BIGELOW.

### Memoir.

IT may not be easy to determine how far the career of an individual is a prolongation of that of his ancestors ; but children instinctively assimilate parental habits and ways of thought, and the teachings which develop natural aptitudes leave enduring marks. The influence of their own youthful experiences, and of the surroundings among which they have grown up, is almost inevitably apparent in the characteristics of distinguished men.

Did these truisms require illustration, it would be found in the subject of the present memoir, whose great natural endowments were an indisputable inheritance from his progenitors.

HENRY JACOB BIGELOW was the son of Jacob Bigelow, third in lineal succession of that name.

As in the case of so many of the foremost New Englanders of those early days, Jacob Bigelow's father was a country clergyman, — Rev. Jacob Bigelow, H. U., 1776, — whose *monumentum aere perennius* is, that he served the same people for more than forty years “without schism or division among his parishioners.”



Jacob Bigelow was born in Sudbury, Massachusetts, February 27, 1787, and was graduated at Harvard in 1806. He received the degree of Doctor of Medicine from the University of Pennsylvania, in 1810. From 1815, and during fifty years thereafter, he was professor of *Materia Medica* in the Medical School of Harvard University; and from 1816 to 1827 he was Rumford Professor of the Application of Science to the Useful Arts, in the academic department of the same University. He was President of the American Academy of Arts and Sciences from 1846 to 1863, when he declined re-election. He was a member of the American Philosophical Society, the Massachusetts Historical Society, the Medico-Chirurgical Society of Edinburgh, the Linnæan Society of London, and of numerous other scientific associations. In 1857, the honorary degree of LL.D. was conferred upon him by his Alma Mater. He was the author of botanical and medical works of permanent value, and of addresses and essays on educational and literary subjects, which are still read with abiding interest.

With the exception of his early youth, Dr. Jacob Bigelow spent his long life of ninety-two years as a resident of Boston, in the steady performance of duties pertaining to an extended practice; esteemed for his private virtues; distinguished alike as the wise and judicious teacher of many pupils, and as the promoter of beneficent public institutions and improvements. "He was the first, as we may say, in Christendom, to conceive, propose, and earnestly and patiently to guide to a complete triumph, the plan of

an extensive forest garden cemetery, realized at Mount Auburn, in 1831.”<sup>1</sup>

In the beginning of his professional career, Dr. Jacob Bigelow was enlarging and gratifying his own mental inquisitiveness. Not being rich, he had to make his own way in the world, and in most of his learning he was his own teacher. He originated his own experiments, and solved his own problems. He was a born artificer, mechanic, and inventor, familiar with the work and methods of every sort of handicraft. The models and drawings for his lectures, as Rumford Professor, were constructed by his own hands. When illustrations were needed for his great work on American Medical Botany, and he found himself responsible for furnishing sixty plates and sixty thousand colored engravings, — photography and even lithography being as yet unknown, — he invented an original mode of printing in color directly from the copperplates.

The womanly virtues of Mary Scollay Bigelow, the wife of Jacob Bigelow, cannot be omitted from mention in this brief summary of retrospective history. Her strength of character, gentle nature, and aptitude in the occupations of her home enhanced the happiness and welfare of all who came within the sway of her gracious influence.

It will thus be seen that the children of these honored parents grew up surrounded by interests inseparable from the pursuits of a busy physician, enthusiastic botanist, learned scientist, and brilliant writer, whose charm of character, artistic tastes, and ways of relax-

<sup>1</sup> Memoir of Jacob Bigelow, by George E. Ellis. 1880.

ation from the severe labors of a literary and professional life were in the highest degree inspiring. In the words of Dr. Ellis: "With the best of schools to train them, what they learned from their father was more and better for heart, mind, and life than book or academy had to teach them."

Dr. Jacob Bigelow's house was on Summer Street, four doors from the west corner of Chauncy Street. Here Henry Jacob was born March 11, 1818, the oldest of five children, — three boys and two girls. His younger brothers died in early life. In that house, and subsequently in one opposite Hawley Street, now part of the premises occupied by C. F. Hovey and Co., he passed his early years.

His formal education began at a child's school, kept by a Miss Ayer. Then, for a year, he went to Thayer's, — so called from its originator and master, Gideon F. Thayer, — a private school of much repute, which still exists in the well-known Chauncy Hall, a name derived from its first location in Chauncy Place. For five years he was a pupil at the Public Latin School, under Master Leverett. When Mr. Leverett left this position and established a private school of his own, Henry Bigelow followed his instructor, with whom he remained until he entered Harvard College, in 1833.

It would be difficult for those whose memories do not carry them back forty years, to realize what Summer Street was in the days of Henry Bigelow's youth. Throughout its entire length there were no shops. As in the main street of an old New England

village, trees were its predominant feature, — spreading elms and horse-chestnuts, whose branches overarched the roadway from Washington Street to Church Green, shading and beautifying the street, and embowering the yards of detached and spacious dwellings, whose occupants lived on more or less intimate terms with one another. Some of the houses were built of wood and gable-roofed, with access through gates to front doors, which opened from side gardens, where the walks were hedged with box, — gardens redolent in their season with honeysuckles, blush-roses, and peonies, or bosky with large and venerable lilac-bushes and altheas.

These secluded yards, and the almost country-like purlieus of Chauncy Place, Bedford Place, and Bedford Street, afforded excellent play-grounds and abundant opportunities for enterprising and restless boys, both in winter and summer; for the custom of leaving town in the warmer weather was not then prevalent. The suburbs of Boston were not far away, and the life of a Boston lad included sports and pastimes almost inaccessible to one pent up within the brick walls of our modern city. In frequent excursions with his companions, and during out-of-town drives with his father, Henry Bigelow acquired many of the rural tastes which he cultivated in his later years. He early became interested in botany, and observant of natural phenomena.

“He was a very handsome boy,” says one of his earliest friends, “with red cheeks, blue eyes, and light hair, and a goodly figure.” Possessed of a pleasant and companionable disposition, brimming over with



spirits, and always on the alert, he was "the light and delight of his home, the most charming, affectionate, gay, and cheery son and brother." He was an adept in dancing, — being a pet pupil of Mr. Lorenzo Papanti, an appreciated and almost historical teacher of that art in Boston, — as well as "an expert in swimming and in the gymnasium," and indeed wherever agility was a requisite. Endowed with remarkable ingenuity in mechanics, he was fertile in contrivances of all sorts. His traits, tastes, and parentage early earned for him, among his comrades, the nickname of "doctor."

His most intimate friends were Henry Lee, at present senior partner in the banking firm of Lee, Higginson, and Co., then living in Bedford Place, and George Cabot, who lived in Summer Street, and died in 1850. Until they went to college, these boys formed "an inseparable trio." Recalling memories of his old play-fellow, at a meeting held shortly after Dr. Bigelow's death by the Boston Society for Medical Improvement, Mr. Lee says : —

"He was a most entertaining companion, not only because of his keen observation of men and things, but also, as well, because of his eccentricities, — his intermittent activity and repose ; his relentless, exhaustive unravelling of some tangled skein, or eager pursuit and abrupt abandonment of one hobby after another ; his absorption in all he was doing, and consequent absent-mindedness ; his intense curiosity about matters (some intrinsically interesting, some uninteresting) ; his secretiveness, or (to say the least) his excessive wariness."

Henry Jacob Bigelow entered Harvard College in 1833, at the age of fifteen. It was then a compara-

tively small institution. The faculty consisted of a president, five professors, and four tutors, — ten in all; and the “Members of the Seminary,” as President Quincy always styled the undergraduates, numbered less than two hundred and thirty.

There was little in the education then offered at Harvard which could appeal to the tastes of a youth so versatile yet so practical as Bigelow. There were no elective studies, not much real instruction, and the invitations to studiousness were slight. He required no great effort to keep up with his classmates, who appreciated him for his capacity in many things, his inventiveness in college pranks, and his intelligence on all occasions which stimulated his curiosity, rather than for his proficiency in any one direction, — except perhaps as a sportsman.

Bigelow belonged to the usual clubs and societies, including the Pierian Sodality, a musical organization, in which he played the French horn. He was an active and also an entertaining member of the Rumford Chemical Society, — an association of students. That he was at the same time seriously interested in its purposes is shown by his having been afterward, for some years, an instructor of medical students in chemistry. It may be added, that in connection with this society he first became familiar with nitrous oxide, or laughing gas, which at a later period — as will be seen further on — was the subject of one of his most important investigations. In those days its administration to students, under the supervision of the Professor of Chemistry, was an annual frolic, held on a



small common near the college; and Henry Bigelow manufactured the gas, in large gasometers, for use on some of these occasions.

In 1833 Old Cambridge was hardly more than a country village. The region in its immediate vicinity was wild, uncultivated, but attractive to those of rural tastes. Palfrey's and Norton's woods, now partially within the college grounds, were the home of a varied fauna and flora; and in these pleasant and accessible resorts the young collegian acquired a knowledge of birds, their haunts and habits, which was always thereafter a source of unfailing pleasure. Fresh Pond and the solitudes of the adjoining meadows were full of snipe and wild duck. The pine woods and sandy wastes about Mount Auburn were already familiar to him as frequented by partridge and quail, and not far away were excellent coverts for woodcock. In other words, good shooting was at the very gate of the college, and offered greater attractions than the more prosaic fields of study. In his love of outdoor life, Henry Bigelow enjoyed the congenial companionship of members of other classes than his own; especially of two young men, who subsequently became physicians, and distinguished themselves as ornithologists, — Samuel Cabot, Jr., and Henry Bryant, with whom a lasting friendship was established.

Bigelow's college career, however, was not without stirring incidents. There was a great rebellion in 1834, his Freshman year. Anxious parents went to Cambridge to look after their boys. It is related that Dr. Bigelow remonstrated with his son for taking part in

this uprising. The latter remarked that he believed there had been a rebellion in the father's day. "Yes," said Dr. Bigelow, "there was, and I see the folly of it now." "Well, I want to see the folly of it too," was the young man's characteristic rejoinder. At another time, as may be read in Mr. Henry Lee's interesting memorabilia of University Hall, in "The Harvard Book," he luckily escaped retribution for the dire offence of sounding in the college yard a trumpet-toned "locust," made of a huge tin coffee-pot, and swung from a broom-handle, by which on a certain evening he startled the proctors, raised a cry of "Heads out!" and brought "all college" to the windows. In this iniquity he was caught red-handed by Tutor McKean, and "dragged into the moonlight for identification." "What is this?" he was asked. "A coffee-pot, sir," replied Bigelow. The sympathetic and wise Tutor "laughed over the invention of the young technologist," says Mr. Lee, "and his gentle reproof lost none of its force because he discharged his duty as a human being, and not as an amateur inquisitor."

But nevertheless Bigelow was "rusticated" just before graduation, and "prohibited from all connection with the town of Cambridge until the Saturday before Commencement," — "three guns having been found in the room occupied by him, and one of the posts in the room perforated by musket bullets"; the enormity of the latter count in this indictment being further aggravated by the fact that "some of them still remained in the wood." In spite of these varied misadventures he was assigned "a part" in the Commencement exercises

at graduation, — a fact which in those days indicated a rank in the first half of his class.

It might seem from this narrative that Harvard College contributed little to make Henry Bigelow the prominent man he became. His ability certainly was not the result of incessant paternal watchfulness, neither was it the product of strict scholastic discipline. On the other hand, if he were no example of conventional and systematic application, he was never an idler. He had a natural craving for such knowledge as he believed would be serviceable to himself and his fellow men. He was inspired by difficulties. He brooded over immature ideas, and was an eager listener to teachings inaudible to others less keenly attentive. Although he did not look back on his college days with enthusiasm, he never regarded them as wasted or misspent.

Bigelow's room was in Hollis throughout his whole college course, but he had a new room-mate every year. His chums were J. F. W. Lane, afterward a physician in Boston; John F. Eustis, who also became a physician; Christopher C. Holmes, long known as a physician in Milton, Massachusetts; and Horatio Hale, now an eminent ethnologist, living in Clinton, Canada. Of these four, Mr. Hale alone survives.

It was merely a coincidence that so many of Bigelow's intimates eventually became physicians. That he himself had made up his mind to enter the medical profession was evident from an early period; indeed, he declared that he never thought of choosing any other.

He had definitely determined to be a surgeon, and, as a matter of course, a surgeon of eminence. While in college, having narrowly missed wounding James Elliot Cabot by the accidental discharge of a gun, he said: "You will tell your children how near Dr. Bigelow, the great American surgeon, came to shooting you!"

Nor was Bigelow to be diverted from his purpose. Dr. James Jackson, whom Dr. Jacob Bigelow regarded with profound esteem and respect, and in whose sound judgment his son had been brought up to place entire confidence, told the young man that his determination to be a surgeon was an immense mistake, as the surgery of Boston was already monopolized by a few individuals. Said he: "Your father is a medical, not a surgical practitioner. You want to forsake your best chance, and try to practise in *that* corner of the room, when all your interests and opportunities are with him, over in the other corner!" To this advice the youth replied, "I'll be damned if I won't be a surgeon!"

Henry Bigelow studied medicine with his father. In that day students entered their names with practising physicians, from whom, for a period of three years, they were supposed to receive medical instruction in various ways, — chiefly, as has been facetiously said, "by doing chores about the house, and taking care of the doctor's horse." During these three years, two courses of lectures, of four months each, were to be attended at some regular medical school. At the expiration of this allotted time of study, and after a successful examination, the degree of M.D. was conferred.



However frequently fagging drudgery may have been exacted from their pupils by country practitioners, young Bigelow knew nothing of it. The simple methods of education then in vogue were in his case raised above their ordinary level by constant companionship with his father and his father's friends, particularly with two who were then in active practice,—Dr. James Jackson, in whose family he spent a long summer at Waltham, and Dr. Oliver Wendell Holmes, with whom he went to Hanover, New Hampshire, to attend a course of lectures delivered by that distinguished teacher as Professor of Anatomy and Physiology at the Medical School of Dartmouth College.

Bigelow's zeal in improving opportunities of all kinds led him, while at Hanover, to dissect the secretory apparatus of a skunk, and he was surprised by its almost complete freedom from odor. Having spread it out and pinned it upon a board, he offered it to Dr. Holmes to smell, with the laconic remark, "Broiled chicken." "Yes," said Dr. Holmes, sniffing it, "with a dash of garlic." Faint though it was, the odor seemed tenacious, and clung especially to the wash-basin in which the dissection had been performed, and which he finally flung out of the window, under the cover of darkness, hoping that it might be shattered to bits. As fate would have it, however, the basin struck neatly on its edge in the soft ground, and remained standing there like a quoit, to be found and brought back by the maid next morning. The landlady's indignant comment, "No gentleman as is a gentleman would have such a smell as that in his room," was often quoted. His shrewd infer-

ence from this incident at the time was that the fetor of the skunk is due to dilution, and possibly to oxidation of the vapor of a nearly odorless secretion; and his deduction finds corroboration in similar changes of quality in the effluvia of certain volatile gases and ethers, now known to be caused by great dilution.

While in Hanover, Henry Bigelow developed threatening pulmonary symptoms. They were, at the time, attributed to inhalations of nitrous oxide gas. Dr. Holmes remarks that he was "perfectly cool about the matter," and that "his natural cheerfulness remained unabated," although the condition of his health boded ill for the anticipations of an active and laborious life.

In 1838-39, Bigelow was House Surgeon in the Massachusetts General Hospital. As the next winter approached he went to Cuba for several months, and thence, in company with his friend, Dr. Samuel Cabot, sailed for Europe, coming home to take his medical degree in the summer of 1841, but returning almost immediately for the renewal of his studies.

The following letter to his father is interesting in every way. It conveys an idea of this contemplative young man not readily obtained elsewhere, and reveals some of the attributes characteristic of his later life. He was but twenty-four years old when it was written.

PARIS, November 19, 1842.

MY DEAR FATHER, — I have just received your kind letter of November 1. You say that happiness does not consist in externals, nor in property. It is a fact of which I have long been convinced. The happiest and best people have not



always the money, — for instance, Dr. Boott, and innumerable others. On the other hand, the money is, much of it, in the hands of undeserving and ignorant people. I say the same to myself of health, by way of consolation. It is a little world that we live in, and our position among its temporalities is of little importanc. This strikes one when one hears of the death of such men as the Due d'Orleans, or the Marquis d'Aguado, who rolled in wealth and comfort here, and who may not unlikely have found their level, by this time, below many of the *chiffoniers* who die of cold and privation. I comfort myself too by comparing little things with great. I have got a chronologieal chart upon which I find America occupying a square inch in a space of six or eight feet filled with the rising and crumbling of whole nations of whom we know little or nothing. How many eases perfectly parallel to ours have existed in the five thousand years of the world's progress, and how many more will occur, of neither of which we know anything! And again, how small and unimportant are our troubles compared with those of a majority of our fellows! Women are making shirts at this moment in England for three half-pence, and find the thread. A woman went to borrow a penny to buy thread, saying that she and her husband would have to wait for bread until she got her three half-pence for the shirts she was making. This world is but a speck in the system, and this system among other systems, and I but a speck in the world. Of what real importance is the house I live in, or the manner I get my money (honestly), or the amount I get, since one hundred years hence nobody will know anything about me? The great end and principle of life is moral accountability; and I must say that I am very indifferent to the opinion of men who steal their money like Mr. —, who sacrifice their souls to it like Mr. —, or who, having amassed it, keep their sons making figures all their youth to the exclusion of every sort of expanded knowledge, like Mr. —. Nevertheless, I am aware that in America money is the great pursuit; that the richest man is the most respected; and I do not mean to say that we should not so far

conform to people around us as to give it a certain amount of attention. It is difficult to say how far we are removed from the original Christian state, which gives all goods to the poor; but I believe it is not less certain that we live in a most distorted and unnatural condition in America, where, after a certain conformity with the conventional rules of morality, a man's, and especially a young man's, merits are measured by his thriftiness, his chance of making money. What would a man like Dr. Boott go for in New York, or what does Mr. Gannett pass for in Boston, except among the few? They are excellent, sincerely good Christians and charitable men. Dr. Boott lacks nothing but thriftiness, and Mr. Gannett, besides this quality, the man-of-the-world talents, which are partly its cause and partly its results. In spite of the force of public opinion, in spite of the "almighty dollar," I do not see the reason for desponding because I do not keep pace with the erroneous notions and pursuits of people around. So much for the local ideas which magnify in our country the presence or absence of property. I do not mean to deny that a man, as a general rule, in a savage or civilized state, should support his family; but I do mean to say that the accumulation of a greater or less amount of property has not the real value which is erroneously attached to it in our country, and that happiness is far from being in proportion to it. A chance which could not be foreseen has willed that you should not accumulate money, which you, from your character, talents, and your industry, had a right to expect; but this event, in this short life, is a very inconsiderable one, compared with those of the real and long one which is to come. For your sake I regret with all my heart that you could not have amassed money enough to spend freely, and indulge your tastes; but none of your children will regret a moment that you did not leave them a *son*, should circumstances so will it. They will remember you as the best of fathers and the soundest of men, who had the warmest of hearts, a most cultivated mind, and an unwavering principle of right and truth; and there are few who leave such a character behind them.

As to what the world will say, who are the world who take it upon themselves to judge between you and your family? They are men of property, who have been studying account books and rates of interest while you have been alleviating pain and suffering; who have ruined their friends and their brothers by extorting the payment of money, while you have diminished your bill to strangers because they found it inconvenient to pay you, and have visited poor people without any recompense at all. They are not the men to stand aloof and give their decisions.

My dear father, I send this fragment of an unfinished letter, which I had laid by to finish, because it expresses a part, though a small part, of what I should like to write to you if I were well enough to write a long letter.

Your affectionate son.

Dr. Bigelow's health having become re-established, he devoted himself with great zeal to his professional pursuits, studying chiefly in Paris, then the acknowledged centre of all that was best and most advanced in medical science. The national traits of the French gave a certain character to their methods of instruction congenial to his quick and mobile temperament; and their influence was noticeable in some of his own subsequent methods as a teacher and lecturer. Not inaptly did one of his pupils, Dr. D. W. Cheever, describe him as a man of the Latin rather than of the Anglo-Saxon type. Although in later years he could make merry over his assiduous note-taking, and with his pre-eminent power of imitation burlesque French medical lecturers, yet even his pleasantry bore the ear-mark of a more than superficial familiarity with the *École Pratique* and the hospital clinics of Paris.

Dr. Bigelow lived in the Quartier Latin, on the Rue

HENRY J. BIGELOW,

FROM A DAGUERREOTYPE BY LÉON FOUCAULT, PARIS,

TAKEN IN 1841.

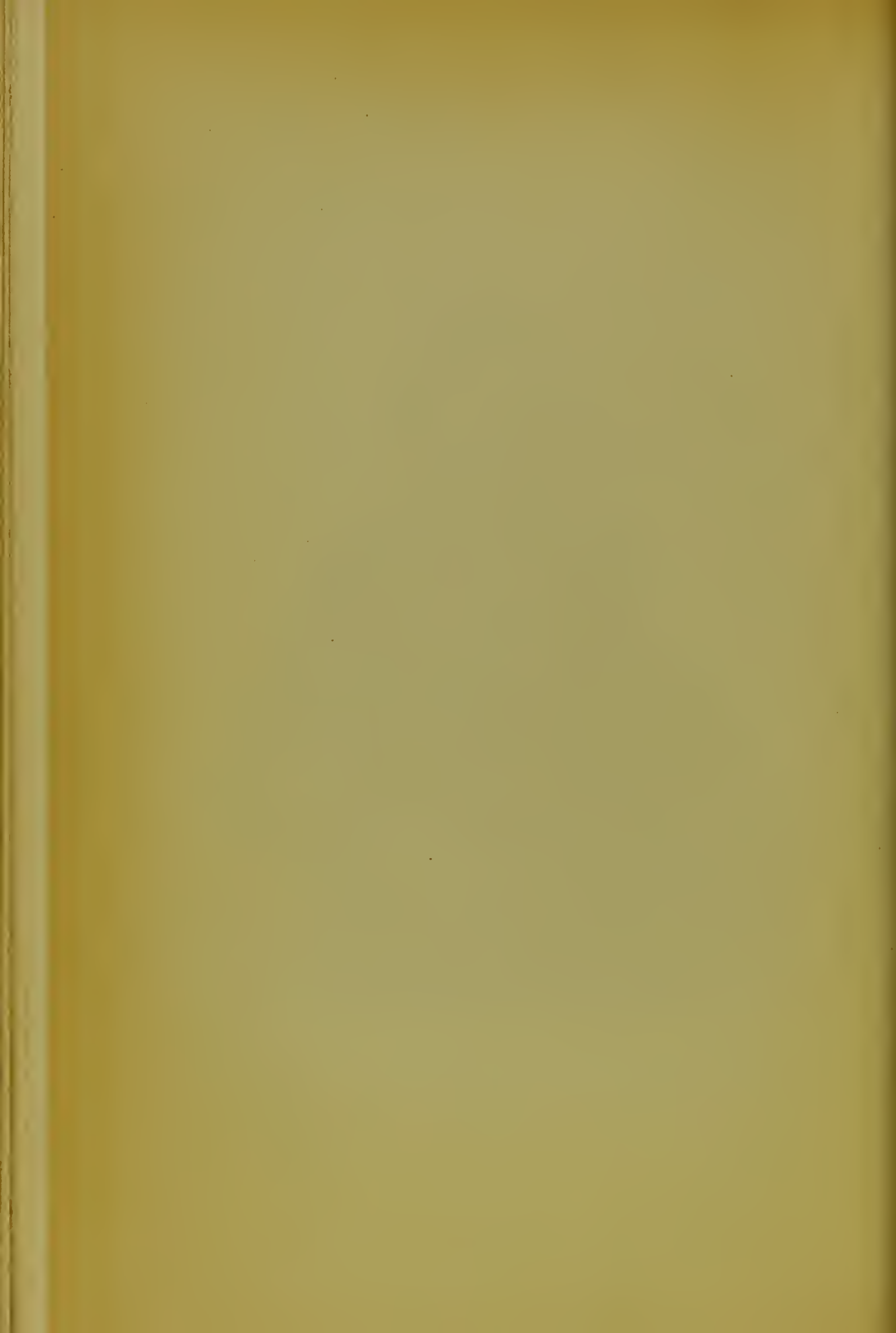
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de Tournon, in the same house with Dr. Jeffries Wyman; and this was the beginning of long and intimate relations between them. No other contemporary did he hold in such high esteem; of no other was he so ready to seek scientific advice, when in doubt or specially interested. Although in many respects their habits of mind were similar, the two men were a great contrast to each other. They were aware of this fact, which was a source of amusement to both, as well as the cause of much badinage on Dr. Bigelow's part. Not infrequently it suggested one of the amusing, though always good-natured, practical jokes he was fond of perpetrating; and some pet animal, such as Dr. Bigelow was accustomed to domesticate in his room, was often made to play a part in these diversions.

While in Paris, Dr. Bigelow had typhoid fever, but with characteristic reserve he concealed this fact from his family at home. On his recovery he went to Italy, spending several months in Rome, where he devoted himself to the art of drawing. He has said that his teacher obliged him, during almost the whole of this time, to delineate the human ear,—which accounts perhaps for the pleasure it gave him in later life, during moments of leisure, to stand before his lecture-room blackboard, and describe with skilful precision free-hand circles and irregular curves, especially the capital letter *S*. Forty years afterward, Alvan Clark, the great telescope maker, used still to tell what perfect circles Dr. Bigelow made with one stroke, when sketching the rough drafts of any apparatus he wished to have constructed.

From Italy, Dr. Bigelow went to Egypt, the city of Thebes being the objective point of his journey. In Cairo, his travelling companion, Mr. William Orne White, was seized with typhoid fever. Dr. Bigelow instantly abandoned the proposed expedition up the Nile, and nursed his friend through a long sickness, until convalescence permitted him to return to Paris.

At the period of Dr. Bigelow's studies in Europe, the introduction of the microscope was beginning to bring medical and surgical pathology into conformity with the newer doctrines of physiology, and to animate professional study with an exactness of research it had never previously possessed. This innovation appealed strongly to his natural instincts, and he lost no opportunity of making himself an adept in the use of an instrument which suggested wider knowledge and a clearer interpretation of the truths of Nature.

The "numerical method" of Louis was still regarded by the followers of that admirable observer as, in the words of Dr. Holmes, "the master key which was to unlock the secrets of disease and its remedies." Although Dr. Bigelow became a personal friend of this great French teacher, the "method" of merely accumulating facts aroused his opposition rather than enlisted his support, by its failure to make any special demand upon the reasoning powers. He was intent upon the search for facts; but they were to be *new* facts, explained by new methods of research.

The superb pathological works of Cruveilhier, of Andral, and of Rayer, represented hardly more than

the exterior of disease. By the microscope a direct revelation of the laws and principles governing the secret processes of disease seemed now to be promised. No one in France, or in all Europe, had then gone so far in the pursuit of this new science in its practical relations to surgery as Mr. (afterward Sir) James Paget, of London, who was at that very time delivering before the Royal College of Surgeons his lectures on the general pathology of the principal surgical diseases, — lectures which contributed so much to his subsequent fame, and which in their final form constituted the classic volume entitled “Lectures on Surgical Pathology.”

Stimulated by the opportunity to follow such a master, Dr. Bigelow made a weekly journey from Paris to London, during an entire course, in order to attend these lectures. The traveller of to-day, by Club Train or Tidal Express, connecting with fast and comfortable Channel steamers, can little appreciate the slow and dreary journey of fifty years ago, which Dr. Bigelow's wise judgment convinced him was worth making, in spite of its exposure and fatigue, with such a compensation as these lectures in view. His perseverance in following them was not less characteristic than the discrimination which led him, while living in Paris, to estimate at its true value the significance of Mr. Paget's instruction in London.

The charm of Mr. Paget's lectures, which were carefully written out, but effectively delivered from memory, was never forgotten by Dr. Bigelow, whose enterprise in attending them was pleasantly referred

to by Sir James when they met, forty years afterward, at the International Congress of Physicians and Surgeons held in London in 1881.

Having accomplished all which he proposed to do in Europe, Dr. Bigelow returned to Boston in 1844, and immediately began practice in a familiar locality on Summer Street, at the west corner of Chauncy Place. By a happy coincidence, Dr. Jeffries Wyman lived in the same house, and there was a renewal of their former intimacy.

In 1844 Boston was a city of scarcely a hundred and fifty thousand inhabitants. Its habits were fixed and conservative, and already regarded as old-fashioned. The Directory of that year enumerates only one hundred and sixty-two members of the Boston Medical Association. Those in the front rank, highly educated according to the standard of the day, held that position largely by seniority. Some of them were by disposition autocrats in their profession. Others, "dividing the world into two groups, — the first, their patients, and the second, those who were not their patients," — fulfilled the demands of the time by a tenacious and exclusive devotion to practice. Others, again, like James Jackson and Jacob Bigelow, had no ambition to lead or succeed except by fidelity to duty and by the force of intellect.

The public and the profession had, however, arrived at a transition period. A few of the younger medical men already felt the coming wave of scientific revolution, though they hardly dared let the fact be known,



lest it should injure their business prospects. The despotic sceptre of the elder generation was gradually escaping from its grasp. New requirements for the common weal were making themselves felt in all departments of life. The "march of enlightenment" had begun, and there was a demand for men qualified to deal with the needs of the time.

Crowded audiences at the Lowell Institute Lectures of Professors Silliman, Lovering, and Jeffries Wyman, as well as at those instituted by the American Academy of Arts and Sciences, indicated an interest in scientific subjects which was deeper than a transient desire for amusement.

Louis Agassiz came to the United States about this time. One of his earliest inquiries was in regard to the existence on this continent of evidence to confirm the correctness of the then novel theory of a glacial epoch. On Castle Rock at Nahant he found, for the first time in America, the grooves and polished surfaces, now familiar to every schoolboy, which had been scored and planed in the irresistible movement of the northern ice-cap. It was Dr. Bigelow who guided him to the spot.

At this juncture, Dr. Bigelow was in a certain sense the most recent medical representative from Europe; and an arrival from Europe was then more of an event and a rarer occurrence than can now readily be understood. He was thoroughly familiar with the refinements of a new pathology, as well as with the latest accomplishments of practical surgery. Conscious of the real forces which were to mould his life, he

had weighed his own ability, and was alive to the fact that it devolved upon himself to make his capacity known. The high places were filled; but it in no way discouraged his determination to confront "the crushing incubus of a notion that judgment and experience come only with age," and to achieve speedily high and responsible professional position. He had little respect for tradition. He intended to be the founder of his own fortune, and to be dependent upon no one but himself for promotion. He made no concealment of his aspirations. His restless energy soon manifested itself, and he may perhaps have seemed imperious and masterful; but he was recognized, among those who knew him, as one mapping out his own path by sheer force and independence of character, undeterred by the fear of seniors or rivals, and undisturbed by criticism. "If he does not become a distinguished man," Dr. James Jackson is declared to have said of Dr. Bigelow, "it will be because Boston is not a large enough field for his ability."

From the moment of Dr. Bigelow's permanent establishment in Boston he became what he always remained, — a prominent figure in social life as well as in medical and scientific circles. As he walked or drove through the streets of the city, he was known of all men. His dashing French cabriolet, the elaborate monogram on his horse's blinders, his fashionable and faultless dress, were unfamiliar spectacles to the staid medical community; and his resplendent carriage lamps were mildly satirized as indicating the rapid increase of his night practice.



When, furthermore, Dr. Bigelow and Dr. Henry Bryant — who had been an *externe* in Paris hospitals — established a “Charitable Surgical Institution” in the basement of the conservative First Church on Chauncy Place, offering their gratuitous services to the poor by means of conspicuous signboards, and distributed circulars among country practitioners inviting them to bring patients to this infirmary for consultation, the consternation among their confrères was both visible and audible. Although harmless satirical squibs, in prose and verse, chronicled these doings, the transitory flurry subsided without giving rise to any Medical Society discipline. The commotion was in reality only an indication of a healthily developing professional condition. As has been said in another connection, “A new light was breaking; and while in reality it was but a gradual dawn, it seemed to the sensitive like a rumbling volcano.”

The famous circular which in part created this turmoil, still remembered by the older friends of Dr. Bigelow, was couched in the following terms:—

Boston, January 1, 1847.

SIR,—The subscribers have established a “Charitable Surgical Institution for Outdoor Patients,” in the building of the “First Church” in Chauncy Place, where they will attend daily, from 11 to 12 o’clock.

They propose to give gratuitous surgical advice, and to perform gratuitously any operation that may prove necessary, either at the rooms or at the boarding-place of the patient in Boston. A medical attendant will reside upon the premises, who will direct patients to good and reasonable boarding-places, and afford any other desired information.

A written diagnosis, prognosis, and course of treatment in any case will be forwarded to any physieian who shall request it in writing.

The subscribers are also ready to operate or to eonsult gratuitously at the residence of the patient in the country, when circumstances render it necessary.

Physicians may at all times obtain vaccinc matter gratuitously at the above rooms, by applying postpaid.

Cases of pulmonary or cardiac disease can also be physically examined at the rooms, as above, if desired.

HENRY JACOB BIGELOW, M. D.,  
One of the Surgeons of the Mass. Gen. Hospital.

HENRY BRYANT, M. D.,  
Late *Externe* at the Hôpital Beaujon, Paris.

One of the *jeux d'esprit* to which the Chauncy Place proclamation gave rise runs in these words : —

BOSTON, March 1, 1847.

DEAR SIR, — You are respectfully informed that the subscribers have opened a Medical and Surgical establishment for the purpose of furnishing gratuitous professional assistanee to all applicants, together with medicines, surgical apparatus, board, lodging, good clothes, and whatever else the eircumstances of the patient may require.

Patients residing at a distance will, on application, have carriages sent gratuitously to take them to our rooms; and those requiring our services at home may depend on our making the utmost speed to their residences.

Nurses, attendants, and all the convenicnees of the sick ehamber gratuitously supplied.

We are also prepared, on receiving from a country physician a carefully written account of any case, to send gratuitously our opinions, with medicines and a coffin; and that our facilitics for giving an accurate diagnosis may be appreciated, we are happy to add that we have recently obtained a

stethoscope of six thousand ordinary stethoscope power, by which means cerebral auscultation can be practised at a great distance, and many things heard which do not in reality exist.

Physicians and patients may be assured that all applicants at our room will receive gratuitously every advantage which the highest professional attainment on our part, and the most unlimited resources, can provide.

The advantages of early application are obvious: it will at once insure to patients the full ardor of our professional zeal, and demonstrate our superiority to all old practitioners and country physicians, and prove that we are illustrious men. To those to whom this may be a matter of doubt, we would add, that one of us, after about only one year's arduous practice, is already made one of the Surgeons of the principal Hospital in New England, having a father, two or three uncles, and several influential friends connected with that institution, who have a just appreciation of us, and through whose interest we hope to fill the Professorship of Anatomy in the Medical School; both of us have also studied either outside or inside of a hospital in Paris.

FESTINANS BIGBLOW, equal to two Surgeons.  
MR. EXTERNUS, recently from abroad.

It will be noticed that the announcement of the Chauncy Place Surgical Institution did not confine itself wholly to surgical overtures. The physical examination of cases of pulmonary and cardiac disease was included among its generous advantages, to which the attention of country doctors and their patients was invited. The extent of Dr. Bigelow's knowledge of auscultation was not generally known either then or in later times; but it was among the studies which had interested him most, both in Paris and during the first few years of his practice. He had mastered the

subject with all the thoroughness possible in those early days of the art. In fact, the writing of a book upon auscultation was an anticipated project, which he would have accomplished but for the appearance, in 1846, of "The Young Stethoscopist," by Dr. Henry I. Bowditch.

Medical prizes are now so numerous as hardly to attract competition; but fifty years ago the gaining of a Boylston Prize, which each year invited the competition of the younger members of the profession, was regarded not only as a favorable introduction to the medical world and the general public, but as almost a prerequisite for success.

Dr. Bigelow wrote for and obtained the prize offered in 1844 for an essay on the question, "In what cases, and to what extent, is the division of muscles and tendons, or other parts, proper for the relief of deformity or lameness?" This inquiry possessed the attraction of novelty, and had received Dr. Bigelow's special attention in Paris as a recent advancement in surgery. Not confining himself within the somewhat narrow limits of the subject as set forth by the prize committee, he prepared a comprehensive treatise of exceptional character, which is still regarded as "a model of excellence, and one of the best publications to illustrate the French school of Orthopædic Surgery, — the dominant school of that time."<sup>1</sup>

<sup>1</sup> President's Address before the American Orthopædic Association, September 17, 1889. By E. H. Bradford, M. D. Boston Medical and Surgical Journal, September 26, 1889.



The chapter on Strabismus in this essay was the first complete presentation of that subject published in America; and to all who remember Dr. Bigelow's familiarity with the mechanism of vocalization, which was so apparent when cleft palate and its remedy by mechanical appliances were matters engaging his special interest, the chapter on Stammering, with its careful analysis of articulate sounds and the manner of their production, will show that he had long been master of that complicated problem. This prize essay was published in an octavo volume in 1845, under the title, "A Manual of Orthopædic Surgery."

Earnest, resolute, and ambitious, convinced by the circumstances of his position that he must, as he said, either work or die, Dr. Bigelow availed himself of an opportunity which grew out of his election, in 1845, as President of the Boylston Medical Society, — a society for mutual improvement, composed of students in the Harvard Medical School, — to deliver as a public lecture before that body an elaborate and erudite address, which, when published in 1846, was entitled "Fragments of Medical Science and Art."

The aim of this discourse was to indicate the value of the inductive method, — founded on the knowledge furnished by hypothesis, and by the alert, intent, and accurate use of the senses, — as against the numerical method, the essentially mechanical processes of which excluded the action of the intellect, and reduced the man of science to a statistician. The mere heaping up of observations could lead only to the recognition of



the common and obvious features of disease, forced into notice by their frequent recurrence. The main value of a fact in Dr. Bigelow's estimation was "its position and suggestiveness in the general sequence of scientific truth, — its relationship to other phenomena." He argued that ability to deduce scientific truth from slight indications marks the genius of the observer. Mentally to grasp the common elements, even of a small number of cases, — too few to make these elements conspicuous, — and by tentative hypotheses, based perhaps upon slender evidence, to discover the complex laws which control them, afterward verifying these laws by a larger collection of facts, was, he urged, the true "wit of science," which sees and combines dissimilar ideas into new and unexpected relations. The following extract will convey an idea of the tone of this instructive address : —

"There is another faculty which contributes to that of detecting relations, and is, perhaps, necessary to it. It is that of forming in the mind distinct conceptions. Men of scientific genius have often been noted for their powers of invention in the immaterial and material world. Discoverers in physical science have not unfrequently betrayed in their youth poetical or mechanical tastes ; and there seems to be something more than a fanciful analogy between these apparently remote attributes. Both call new powers into being. Poetry embodies sentiment. Both animate matter ; both are gifts of Nature, and are characterized by a power of combining material representations of abstract ideas.

"By mechanical taste I do not mean a taste for the use of the implements of art, but true mechanical genius, which is often impatient of the drudgery of manual labor. It makes its combinations in the mind for the pleasure of the effort,

and passes from one to another, perhaps regardless of their ever attaining perfection in a material form. Herschel has said that 'almost all the great combinations of modern mechanics, and many of its refinements and nicer improvements, are creations of pure intellect, grounding its exertion upon a moderate number of very elementary propositions in theoretical mechanics and geometry.'

"The mind of the inventor, as it combines the cams and levers, suggests, on a small scale, as many new relations, and rejects as many useless combinations, as that of the discoverer of the universe. Such genius has a facility in placing conceptions distinctly before the mind. Kepler says, 'In the year 1595 I brooded, with the whole energy of my mind, on the subject of the Copernican system.' Newton said he made his discoveries 'by always thinking about them. I keep the subject of my inquiry always before me, and wait till the first dawning opens gradually, by little and little, into a full light.'

"But there is an active process going on in such a mind. It separates at a glance a complicated union into its elements, perceives what is essential to it, and again unites these elements, arranging what is necessary and rejecting what is useless to the new fabric. It is the struggle for clear conceptions, the tendency to embody abstractions, the effort to associate ideal relations with some probable material form, that leads such a mind to new combinations and new discovery."<sup>1</sup>

As he left the room at the close of this address, Edward Everett said to a friend, "There goes a future Professor,"—and later took occasion to compliment Dr. Bigelow warmly, calling the address "an honor to its author, and to the city of Boston."

In commending this production, Dr. Oliver Wendell Holmes says: "It was not so much the originality of the thesis maintained by Dr. Bigelow, as the reason-

<sup>1</sup> Pages 29-31.

able and forcible method by which he expounded and illustrated it, and the peculiar fitness of his choice of a subject at that particular time. He knew when to strike, as well as how to strike." Dr. Holmes further adds, that Dr. Bigelow "handled his knowledge of the great authors he cited so like an adept in book-lore that one might have thought he was born in an alcove and cradled on a book-shelf."

On the 28th of January, 1846, Dr. Bigelow was appointed a visiting surgeon of the Massachusetts General Hospital, which had recently been nearly doubled in capacity. This enlargement necessitated an increase in the surgical as well as the medical staff; and Dr. Samuel Parkman and Dr. J. Mason Warren were also appointed surgeons at the same time with Dr. Bigelow.

The surgeons already in charge of the Hospital were men greatly the seniors of the new appointees. Dr. Bigelow was but twenty-eight years old; and the intrusion of young men within this sacred circle seemed almost like the profanation of an Eleusinian mystery, so long had its immutability and conservatism prevailed.

Dr. Bigelow was not given to ceremonial observances; but the dignified formalities of the Hospital consultations, the absence of all ostentation, the well ordered and noiseless discipline of its operating theatre, the perfection of its facilities, its calm and methodical tranquillity,—stamped indelibly upon this now classic abode of surgery by its first appointed surgeon,

Dr. John C. Warren, and which had not ceased when Dr. Bigelow resigned his office in 1886, — were always regarded, and often publicly spoken of, by him as a cause of gratitude to the masterly power of organization possessed by that distinguished surgeon.

Owing to the unfinished condition of the new portion of the Hospital, the year 1846 was drawing to its close before the junior surgeons entered actively upon their duties.

In the month of October that great episode in the history of the Massachusetts General Hospital occurred, — the discovery of anæsthesia by sulphuric ether. The story of Dr. Bigelow's connection with the introduction and adoption of surgical anæsthesia is now familiar to the public. A less courageous or a duller man might have said, "Perhaps something may be made of this by and by!" but from the moment of the first demonstration Dr. Bigelow saw that the discovery was unapproachable in magnitude; and he resolutely put his shoulder to the wheel, to push it on to its full beneficent success. Dr. Oliver Wendell Holmes, in his American Academy Memoir of Dr. Bigelow, says in this connection: —

"No person took hold of Dr. Morton's discovery with such far-seeing, almost prophetic appreciation, as the young surgeon who had been but a few years in practice, and who threw all the energy of his early manhood into his advocacy of the new and startling innovation which was destined to change the whole aspect of surgery. It was not merely by his sagacious foresight that he recognized the importance of this epoch-making novelty, but throughout its subsequent history he was the foremost champion of artificial anæsthesia."



The opposition which followed the first experiment with ether was met by Dr. Bigelow's determination that the absolute demonstration of its efficacy should not be embarrassed by a momentary or a seeming hostility. But for his quick analysis of the equations involved, the rivalry for the performance of the first capital operation under ether would have pursued its course, and the painless amputation of Alice Mohan's thigh would not have taken place on November 7, 1846. It has, indeed, been declared that to him "the world is directly indebted for the introduction of anæsthesia in surgery at the exact time that it occurred."<sup>1</sup>

Dr. Henry G. Clark, in his Annual Address before the Massachusetts Medical Society, June 3, 1868, alluding to the above-mentioned operation, says: —

"The world does not know, nor will it until the true history of the use of ether in this case comes to be written, how near to a lost opportunity this was; nor how much it was indebted for its triumphant success (I believe I violate no confidence in saying so) to the sagacity, the adroitness, and the energetic remonstrances against the obstructive etiquette and red tape which imperilled everything, of the then junior, and now senior, surgeon of the Hospital, Dr. Henry J. Bigelow."

In a letter in behalf of Dr. Morton, Dr. Bigelow asks: "Would surgeons have given a surgical dose of ether vapor, on all the existing evidence, five minutes before Morton's first successful experiment?" and adds, "*It was assuredly difficult enough to persuade them to do so afterwards.*"

With a determined purpose Dr. Bigelow exerted himself to secure Morton a fair hearing and a just

<sup>1</sup> Nation, February 24, 1876.



verdict, defending his claims wholly upon the basis of what constitutes, according to precedent, an invention in science, and because the first perfect knowledge as to the points of *safety*, *certainty*, and *completeness* came through Morton alone.

Dr. Bigelow wrote the article announcing this discovery to the scientific world, as well as the first letter carrying the news to Europe. He received in return (from Dr. Francis Boott, of London, to whom the communication was addressed) a number of letters from distinguished surgeons, which are still interesting, as showing the status of knowledge at that date. For thirty years — 1846 to 1876 — he was a frequent writer on the subject of anæsthesia, never allowing its cause to go by default for want of a defender; and although his writings represent but a small part of what he actually did, by his courage and profound interest in the great discovery, to promote its adoption and perfection, they cover the discussion of surgical anæsthesia in all its bearings, — historical, controversial, physiological, and practical, — and are pervaded by a discriminating judgment and a convincing knowledge of the whole field of inquiry.

Dr. Bigelow was “the unflinching advocate of sulphuric ether” as the only safe anæsthetic; and his unshaken opinion “had a very wide and lasting influence.” He instituted important and productive experiments in anæsthesia. He inhaled new and untried anæsthetic agents. He made practical and original studies of asphyxia, and thoroughly established the fact that in-

sensibility from the inhalation of nitrous oxide gas is due to asphyxia. He was also the first to show that anæsthesia by nitrous oxide could be accomplished with certainty only by the use of a large volume of gas; and thus made the way plain to Colton and others for its successful adoption in tooth-pulling, and in brief surgical operations. He also discovered the anæsthetic properties of keroselene by his own inhalation of its vapor. He interested himself in procuring anæsthesia by freezing in various ways, particularly through the atomization of rhigolene, — an extremely volatile liquid derived, like keroselene, from petroleum oil; and in this connection he engaged minutely in the construction of Bergsen tubes, and was the first to make them of metal, those previously in use having been drawn from glass.

So largely instrumental was Dr. Bigelow's influence in rendering anæsthesia by ether practicable and available, that his name is permanently identified with the discovery, — an honor conceded to him by all whose personal cognizance of the facts gives value to their opinion. This relation was in a measure recognized, when, on the completion of the monument in the Public Garden of Boston, erected by the late Mr. Thomas Lee, to commemorate "the discovery that the inhaling of ether causes insensibility to pain," Dr. Bigelow was instinctively selected to deliver the address of dedication. The small assemblage present on that beautiful evening in June, 1868, cannot have forgotten his eloquent words, or the solemn sentiment of the occasion.

As Dr. A. T. Cabot has said, Dr. Bigelow's own aversion to giving pain must often have caused him to look back with peculiar pleasure upon his share in alleviating surgical suffering.

During the year succeeding this discovery, Dr. Bigelow gave his personal attention to the administration of ether in the Massachusetts General Hospital. His course of action in regard to the whole subject in that institution brought forcibly into prominence his independence of character, and contributed to his rapidly growing reputation as a professional leader.

Almost from the commencement of his connection with the Hospital, Dr. Bigelow became one of its chief attractions to medical men and students; and this attraction arose from various causes. He was exceptionally young for a surgeon already distinguished. He was fine looking. His dress and manners were those of a gentleman and man of the world, and not of the conventional doctor. He carried no gold-headed cane. He was not oracular and grave in speech, but said what he had to say offhand, in a mellifluous voice, and with a distinct enunciation. He had what, for the want of a better term, is called personal magnetism. He was alert and active in every movement, full of life and animation. In the jargon of medical students, he was a "brilliant operator"; to see him "manipulate," as they said, was worth the sacrifice of duties usually deemed imperative.

Dr. Holmes says that Dr. Bigelow was in a "state of excitement" when he came to his house to tell him

of the first operation performed under the influence of ether. The occasion justified emotion; but it is safe to say that nothing short of such an event could ever disturb his equanimity. His coolness and self-possession, under all circumstances, were attributes which added greatly to his power and popularity as a surgeon. Nothing startled or disconcerted him,—threatened catastrophe, hemorrhage, or unforeseen difficulties.

As a surgical operator Dr. Bigelow possessed, unequivocally, what may be called “style.” His bearing and attitude were striking, but always dignified. To an exceptional degree he had an adroit and graceful use of his hands and fingers. He was habituated to the use of tools, and at home with every surgical instrument. He never *fumbled*, or merely went through the motions of an operation without accomplishing its object. He always knew what he intended to do, and accomplished it with neatness. Nothing annoyed him more than uncovered or unremoved traces of blood. He was precise, confident, deliberate, and sometimes original in method. “To see him operate was to recognize a master,” says Dr. D. W. Cheever. His artistic turn of mind showed itself in everything he did in surgery. When he was accused of display, it was because he was simply and unconsciously graphic. He would, for instance, open a large superficial abscess with the longest amputating knife he could put his hand upon, and do it with a single stroke,—not on the principle of Harlequin, who uses his sword to cut a slice of bread, but because in a plain case it was the



most efficient way of accomplishing his object. There was an *élan* about this which was impressive to students; but it taught them to make large, free incisions, — a point which he always insisted upon, not less than upon the truism, “When you have a cut to make, make it!” In a serious operation, however, he never allowed himself to be led away by this ability to operate showily.

Dr. Bigelow had the faculty of instant decision. He knew every phase of anæsthesia, and if emergencies arose he was prepared for them. Thus, in a case of perilous asphyxia from blood entering the trachea during an operation, the ordinary measures of relief under such circumstances having failed, he opened the windpipe with one stroke of a scalpel, passed an elastic catheter beyond the point of obstruction, and blowing through it expelled the clot by driving it upward; the operation then went on. This original method, adopted on the spur of the moment, was first resorted to in June, 1867, and has proved equally successful in similar critical emergencies.<sup>1</sup>

With a manual dexterity so pronounced, Dr. Bigelow could not but take pleasure in operative surgery. He enjoyed the mechanical part of his calling, as must every man who does what he knows he can do well; but no surgeon ever considered this particular faculty of less account. The surgery which heightened his pulse was that which took its inspiration from the brain,

<sup>1</sup> New York Medical Journal, November 1, 1884, p. 486. Boston Medical and Surgical Journal, December 14, 1882. Philadelphia Medical News, July 12, 1884.



not from the fingers. In "Fragments of Medical Science and Art" he says to students:—

"Do not identify surgery with the knife, — with blood and dashing elegance. Distrust surgical intrepidity and boldness. If such epithets have any meaning, they are in bad taste, and tend to give wrong impressions of scientific excellence. . . . The right subclavian artery and the innominata have been often tied with success, and the patient has always died. . . . Science never hears of the ten or twenty quiet sufferers who fall victims to the publicity of an exceptional escape from surgical intrepidity. Surgery is not operative surgery. Its province is to save, not to destroy; and an operation is an avowal of its own inadequacy."

No applause which greeted Dr. Bigelow's operative skill gave him a tithe of the gratification in being reminded, by the publication of some original investigation, of his own anterior studies,—of his observations on the structure of epithelioma in 1851; on the inoculability of cancer in 1856; or, when the curative effect of erysipelas upon malignant tumors was discussed in 1883, that he had recognized and lectured on it years before.

In the routine of surgical work, Dr. Bigelow was the originator of many better methods. In exceptional cases some new device, or appliance, was sure to suggest itself. At times this would be a homely expedient; at others, an elaborate construction, costing days of co-operation with mechanics. His improvements of surgeons' tools were countless. Dr. H. H. A. Beach says:—

"There is hardly an instrument in the operating cases of the Massachusetts General Hospital which does not show some advantage gained from his working with it. When he

became satisfied that such or such an instrument was the best to work with, others were glad to work with it. They were sure that he had sifted the question of its adaptation to the bottom."

Those instruments which, like a pistol, are held in the full hand, were the subject of long continued experiments by Dr. Bigelow. By grasping a handle, after it had been embedded in clay or plaster of Paris, which, when hardened, left an impression of his grip, he determined upon the correct shape and slant it should have. The curious moulds thus taken indicate that very few handles possess the best contour or angle, and that they should not be the same for both the right and left hand. A practical application of the results of this investigation was made to several surgical instruments, including his lithotrite.

Dr. Bigelow looked with a feeling akin to contempt upon a man who attached his name to an instrumental improvement, or described it in medical journals. His own modifications of instruments, therefore, even when regarded as indispensable by his colleagues,—with the exception of his lithotrites,—are scarcely known outside the Massachusetts General Hospital.<sup>1</sup> He believed in having the most perfect utensils for his work, although he could, and at times in an emergency did, perform operations with primitive or unusual appli-

<sup>1</sup> The following list includes some of the more noticeable instruments modified or originated by Dr. Bigelow: tourniquets for thigh, arm, and wrist; needle-holders; sinus dilator; handles for drills, etc.; mouth-gags; urethral divulsor; retractors for amputations; polypus forceps; compressor for aneurisms; torsion instruments; artery forceps, with device for discharging ligatures; autopsy tables; operating chair; apparatus for angular extension.

ances. Accordingly, being in Europe in 1869, he purchased at a cost of several thousand dollars an outfit of surgical instruments adapted to hospital use. These, and the four large mahogany and glass cases which contain them, he presented to the Hospital, together with a sum of money for their perpetual replenishment and repair.

As already stated, Dr. Bigelow was himself a good mechanic. This faculty showed itself in early boyhood, not only in his constructiveness, but in his exceptional skill in jugglery. He was familiar with the mechanical arts in detail; but he recognized that his own thought and time could be more wisely utilized than in work which might be as well done by expert operatives. Thus, he once wrote:—

“I remember when, allured by the genial atmosphere of Izaak Walton, and having a fondness for doing things scientifically, I sought in the woods, as he directed, a hazel of fair proportions; but long before its months of seasoning had elapsed I wisely concluded that I wanted, not to file ferules or to twist lines, but to fish in some secluded spot, amid the grateful influences of spring, and I bought a better rod than I could make. Since then, in the avocations of life, I have often considered exactly what I wanted, — whether fishing, country air, or rods, — and have reached out for it by the shortest cut.”

Dr. Bigelow's inclination was to direct and oversee rather than to execute. Many skilful artisans, slow to comprehend or clumsy in performance, would often find themselves taking a practical lesson from the technologist at their elbow. Even the sculptor who

made his bust, and the painter of his portrait, accepted his suggestions as to the best method of producing certain effects.

Waiting in a business office for the arrival of a friend, Dr. Bigelow observed an office boy assiduously practising writing, and endeavoring to embellish his exercise with flourishes and scrolls. He suggested to the boy that it would be wiser not to attempt to acquire an ornamental hand; and, finding a docile pupil, gave him a lesson in correct penmanship, repeating it on many subsequent occasions, with results of lasting value to the boy and to his employers. Here he found a lad trying to do something well, and instinctively taught him how to do it better. This good-natured impulse was characteristic of the man.

But Dr. Bigelow was vastly more than a mechanic. He had the inventive faculty. In his spare moments he was always designing something. The covers of his note-books, scraps of paper and old envelopes in his pocket, were continually utilized for sketching his chance thoughts in the line of mechanical contrivance. He was wont to say that the process of invention consists of three distinct stages. First, the inventor should set before his mind, as clearly and simply as possible, exactly what he wishes to accomplish; this step is short and easy. The second step is to make some mechanical arrangement or combination which will procure the desired result; this also is an easy matter, needing but little time or thought. The third step is to reduce the mechanical combination to its simplest terms; and that part of the process may take



months or years. He repeated this formula, on one occasion, to Erastus B. Bigelow, the inventor of the carpet loom, who recognized from his own experience the accuracy of the conception, and corroborated it as a matter of fact.

In an unpublished paper Dr. Bigelow writes as follows : —

“To invent a machine, or to devise a method or a plan, requires first a precise determination of the ends to be accomplished; secondly, a selection of means, involving judgment; thirdly, a combination of the various fragmentary methods, — a field for the imaginative faculty, involving the perception of harmonious action, coaptation, and concurrence. It is needless to say that each added element requires a reconsideration, and probably a change of many previous ones.

“Herschel affirmed that the inventive faculty involved some of the highest powers of the human mind. And it should be remarked that Mechanics are not Mathematics. The provinces of both are high, but wholly different. One determines how, and the other how much, — two very different considerations. The one says, ‘Use here a cam or an incline,’ and the other calculates the curve necessary to the cam or to the turbine.”

It is not uninteresting to observe here an insistence on the use of imagination in science, — the theme of his earliest disquisition, — still prevailing in an article written more than forty years later.

Among the conspicuous inventions of Dr. Bigelow is an autopsy table, of entirely original design, which successfully provides for the disposal of gases and liquids during post-mortem examinations. The complex requirements of effective artificial draughts, of drainage, and various sorts of utility called for in such



a table, involved a great deal of constructive detail, especially in the line of plumber's, boiler-maker's, and blacksmith's work; but all these essential features were so admirably combined, and so perfectly adapted to their purposes, that the table has stood the test of twenty years of constant service, approved by those whose comfort it was intended to promote, and invariably eliciting praise from all experts in practical pathology who visit the Massachusetts General Hospital.

Still another elaborate illustration of inventiveness exists in Dr. Bigelow's operating chair, of which it has been said, as of many other ingenious contrivances, "It can do anything but speak." This chair is intended for patients undergoing surgical operations, and possesses no novelty in its idea, which is the common one of adaptation to the various postures which the convenience of the surgeon may require. The unique and concealed mechanism, which when exposed to view reminds one of the gears, quadrants, and ratchets displayed as the ostensible motors of Maelzel's automaton chess-player, owes its exceptional character to the fact that the various movements can be started or arrested at any point, to use medical language, either of flexion or extension, to the freedom of these movements from any jerks or catches, and to its constructive adaptation to the uses which the chair is subjected to. Built in 1854, it has never required any repairs during nearly forty years of active wear and tear.

When Dom Pedro, Emperor of Brazil, visited the Massachusetts General Hospital in 1876, he was so much interested in this chair that, being in Berlin

shortly afterward, he mentioned its great merits to Augusta, Empress of Germany, who was at that time greatly occupied with matters pertaining to military hospitals. In her behalf a request was made to Dr. Bigelow for a set of working drawings, from which a similar chair might be reproduced.

These plans were sent to her; and in recognition of this service Dr. Bigelow received a copy of a recently published work, the "Handbuch der Kriegschirurgischen Technik," by Dr. Friedrich Esmarch (Hannover, 1877), which had been written in successful competition for a large prize in money, offered by the Empress for the best work on "The Surgical Appliances and the Operations of Military Surgery," — the presentation volume bearing a holograph inscription by her Majesty. Subsequently Dr. Bigelow wrote the following letter: —

Boston, January 15, 1882.

DEAR BARON VON LANGENBECK, — A few years ago, when the Emperor of Brazil, who, as you well remember, took a very remarkable interest in a great variety of subjects, did us the honor to visit the Massachusetts General Hospital in Boston, he asked, among other things, a number of questions relating to a surgical operating chair which I had caused to be made many years before.

Not long after this, I received, through a friend of mine, a letter from the Baron von der Heydt, and also one from Dr. Max Rille, making inquiries about this surgical chair, of which the Emperor of Brazil had spoken to the Empress of Germany.

I naturally felt honored by the interest of such distinguished personages in an American device of so small importance, but much more so when I received, by the direction

of the Empress, a volume on the Operations of Military Surgery, by Professor Esmarch, — to which the large prize offered by the Empress at the time of the Vienna Exposition had been awarded, — containing the autograph of her Majesty upon the titlepage.

I have been wholly at a loss how to express my gratitude for this manifestation of the kindness and good will of the Empress toward this side of the water, which I am sensible was also prompted by her well-known devotion to matters in any way connected with the relief of the sick and wounded.

But I venture to send you a set of my instruments which have been lately modified and completed. I take the liberty to ask you to offer it, should it be in every way proper so to do, for the acceptance of the Augusta Hospital, in which, as we are well aware, the Empress has felt so much interest, and her benevolent attitude to which has encouraged so greatly the cause of humanity everywhere.

I make bold to ask of you this favor with less hesitation, because I have some reason to believe that both the operation and the instruments have received your valuable endorsement.

I am, dear sir, with great esteem,

Your friend and servant,

HENRY J. BIGELOW.

The surgical pre-eminence of Dr. Bigelow was not chiefly attained, however, by his adroitness as an operator, or by his mechanical ingenuity. He was a man of thought, as well as of action. His reasoning powers and physical senses were always wide awake. He had a retentive memory. He possessed clear and accurate judgment and strong common sense, and knew how to use them. His tact and persuasive powers were immense. He was good-natured, and, as has been said, "could read men and women as

a scholar reads books." Moreover, he was a pathologist, and an accurate, clear, and logical diagnostician, as well as a wise practitioner.

Dr. Bigelow valued judgment in a medical man quite as highly as he did scientific acquirements. In several of his addresses he reiterates the declaration that —

"No quality is more essential to sound medical practice than sound judgment. . . . An enlightened judgment is as necessary as an informed conscience. . . . If we do not set the landmarks of judgment firmly, learning may displace them disastrously. . . . Sound judgment is some offset to imperfect knowledge. . . . The excellence of a practitioner does not depend upon great learning, but upon a wide practical experience and the sound judgment which have taught him not to harass disease with uncertain and conventional remedies. . . . When probability is substituted for certainty, an informed judgment is our only resource. . . . A skilful surgeon detects fluid, not because his tactile papillæ are more sensitive, but because his ready knowledge furnishes him with natural groups of symptoms, which now exaggerate and now discountenance the value he would attach to the indications of the tactile sense."

In this last sentence country students were shown why some of their plain but long-headed preceptors were, as they said, "great on deep-seated fluctuation."

Dr. Bigelow made brief and rapid hospital visits.<sup>1</sup> Chronic cases, convalescents, fractures doing well, he

<sup>1</sup> The Rev. Dr. Hamlin, then President of Robert College, Constantinople, underwent a grave and perplexing surgical operation at the Massachusetts General Hospital in 1874. He says: "I had been cautioned that Dr. Bigelow, although he would be the most skilful operator, would probably leave me after a few visits, and be seen no more. I kept count of the visits he paid me, — they numbered sixty-seven. I owe him no common debt of gratitude." — *My Life and Times*, by Cyrus Hamlin, 1893, p. 495.



passed by with scarcely more than a friendly nod; but when a patient was not getting on satisfactorily, or was in pain, — which to him was much the same, — no surgeon could be more assiduous in placing things in proper train, or more exacting of nurses or house officers. He was an indignant adversary of mere activity, of incessant manipulation, and of “incompetent or solemn meddling.” To use his own words, he never “dug up his beans to see how they were growing.” Although Dr. Bigelow did not linger at every bedside, he invariably paused if the sufferer were a child; and nothing could be more winsome than the expression of his countenance when lighted by the interest which he invariably felt for children. In such cases as would permit, he lost no opportunity of teaching practical precepts to his students, or of impressing upon their minds, often by vehement words, the fact that pain in surgical cases is ordinarily within control.

These visits with the students were not unfrequently enlivened by jocose banter. One of his house surgeons having received permission to graft a certain chronic ulcer, Dr. Bigelow, on reaching the bedside of the patient, inquired about the grafts. Learning that twelve had been planted, and that all but one had taken, he asked, with a waggish expression, “Can you see them with the naked eye?” “Yes,” was the response; but when the bandage was removed from the ulcer, nothing was visible. Turning to the students, Dr. Bigelow said, “You can see more with a critical eye than with a naked eye, but with no eye so much as the eye of faith. Now, gentlemen, you may



look for these grafts with the naked eye ; I will look with a critical eye ; and we will let Mr. —— look with the eye of faith. Then we will compare notes.”

A former pupil, Dr. Hasket Derby, at the memorial meeting of the Boston Society for Medical Improvement, impressively stated that no one who had passed a year at the Massachusetts General Hospital as Dr. Bigelow's house surgeon “could fail to recognize the effect on his own subsequent career of the time thus spent. The subtle influence over his students was felt the more for being insensibly exerted.”

Dr. Derby rightly considered Dr. Bigelow as “the one surgeon who apparently allowed every responsibility to devolve upon his assistant.” Nevertheless, “all that went on was keenly, if silently, observed ; and the tyro whose diligence slackened, or whose conceit led him to suppose he might vary ever so slightly from the proper course, would unexpectedly discover his mistake. The lesson thus given was never forgotten. But the diligent and faithful student had nothing to fear. His unavoidable shortcomings would be forgiven, and his earnest efforts were rewarded with the bright smile or the single word, which, from such a master, was worth many a set speech of dull laudation. Yet the faculties must ever be on the alert, and the senses always sharpened. The pupil needed all his strength, physical as well as mental, to follow the master he served.”

In the spring of 1865 Professor Lister, of Edinburgh, published his first article describing the method of

dressing wounds by which his name has been made universally familiar to surgeons. In the autumn of that year, under Dr. Bigelow's direction, Dr. H. H. A. Beach, then a house surgeon of the Massachusetts General Hospital, applied to two amputations the first "Lister dressings" ever used in the wards of that institution. Although they answered their purpose, the method did not strongly commend itself, and was temporarily abandoned. Even at that early period, however, Dr. Bigelow was not an entire stranger to such advanced surgical procedures, for in 1879 he wrote: —

"It was more than twenty-five years ago, as I was lately reminded by a former house surgeon, that I usually left the bandages upon an amputation so long as a solution of chlorinated soda, frequently applied to the outside, would keep them odorless."

In other words, he had already recognized the distinctive principles of non-disturbance and the prevention of decomposition. When therefore, in 1875, accumulating evidence strengthened his convictions of the theoretical as well as practical correctness of the newly promulgated views in regard to asepticism, and he had procured from London the atomizers and appliances of Sir Joseph Lister, he entered with renewed zeal upon a series of experiments as to the various minutiae and the efficacy of the still hesitatingly accepted "Lister's method." In 1892, Dr. Beach, then a colleague of Dr. Bigelow, said: —

"I was associated with him throughout that time of the development of the system, and can testify to his unfailing fidelity to its requirements. No one recognized the princi-

ples of antiseptics more appreciatively than Dr. Bigelow, or was more enthusiastic in their acceptance."

Although Dr. Bigelow found it impossible personally to attend to the time-exacting details, and knew — owing to the modifications which antiseptic methods were destined to undergo in their slow and gradual perfection — that a long time must elapse before they could be intrusted, as at present, to competent house pupils, it would be impossible for any surgeon to do more than Dr. Bigelow himself did, during the subsequent years of his service, to attain the desired results of this great surgical improvement. Almost the only lectures he ever wrote out himself were those which he delivered upon antiseptics. Though they discuss what may now be considered the elementary stages of a system then in its infancy, his recognition of the great facts of sepsis are manifest on every page, and his note-books of the time are full of suggestive and speculative thoughts on the germ theory, and the art of promoting the repair of wounds.<sup>1</sup>

Apart from the requirements of his professional duties there, Dr. Bigelow was deeply interested in the management of the Massachusetts General Hospital, and habitually gave it an amount of time, and often of physical labor, which indicated how large a place that institution occupied in his thoughts. This Hospital has always inspired the fervid attachment of those holding any relation to it whatsoever, — whether as citizens, proud of its benevolent services; as pupils,

<sup>1</sup> Boston Medical and Surgical Journal, June 5, 1879.

grateful for its teachings; or as medical officers, who have put their own work into its comprehensive fields of usefulness. It has universally fostered a feeling of affection, such as is cherished for an Alma Mater. The relations of its physicians and surgeons have always been of the most amicable nature.

By no one were these cordial sentiments more strongly felt than by Dr. Bigelow. He desired the Hospital to be the best in existence, as to its administration, its charity, and its reputation as a centre from which surgery radiated its benefits. To the accomplishment of these objects he was at all times ready to devote himself. He had decided views as to what the best interests of the Hospital demanded. On several occasions problems of policy were earnestly discussed at great length by the trustees of the Hospital, and by its physicians and surgeons. Among such discussions none engaged Dr. Bigelow's attention more than those growing out of the proposals to establish wards for special diseases, and to concede the right of attending medical officers to receive fees from patients under their care in the Hospital. He believed that the institution of special wards would be a serious injury to the existing departments, and an unwise employment of the limited funds of a general hospital; that it was impossible to create one special service or ward within the Hospital and not others also, in an indefinite series.

When, therefore, the surgeons learned that the trustees had decided to add to the Hospital a considerable number of beds — some of them free — for patients affected with eruptions of the skin, they felt it their



duty to the surgical department, unequal as it already was to meet the demands made upon it, to present to the trustees a remonstrance upon the subject. The trustees, however, declined to receive the protest addressed to them.

Believing it important for the welfare of patients that medical officers should express an opinion upon matters pertaining to medical administration, the surgeons again remonstrated, and once more declared their conviction that if the trustees felt able to make a considerable addition to the number of free beds in the Hospital, the peculiarities of skin disease were not such as to give it "a stronger claim to an increased and separate accommodation over all, or any other, of the whole range of medical and surgical affections, including surgical accidents."

This unpleasant controversy was so ably managed by Dr. Bigelow that the trustees revoked their decision.

The right of attending physicians or surgeons to demand or to accept fees from any class of patients, under any circumstances, was regarded by Dr. Bigelow as a far-reaching question of hospital policy. He was outspoken in his denunciation of such a concession; and in 1889, after his withdrawal from the Massachusetts General Hospital, he was still so much interested in the subject as to publish a paper upon it in the "Boston Medical and Surgical Journal" for April 18 of that year. Therein he says: —

"A public hospital is a trust, originally set apart as a charity for the sick, and not for the pecuniary benefit of their attendants. Whatever, in a charitable institution, is prac-



tised for any other end leads to its gradual, insidious deterioration. Whatever diverts the property, the resources, or the conveniences of a charity trust—or even the patients who apply for them—to the private advantage of its officers, is a form of the spoils system. . . . If a hospital is dependent upon legacies and charitable subscriptions, it should be able to go to the community with clean hands. No appeal in its behalf would excite much sympathy were it known that a portion of the money given was to enable medical men to collect fees more conveniently.”

The earliest agitation of this question had already led the trustees of the Hospital to place in every ward and private room of the institution a printed notice, to the effect that, by virtue of his appointment, each of its physicians and surgeons “waives all claim for compensation in money, and performs his duty as a charity to the sick and disabled patients under his care, and for the advancement of medical and surgical science.” It was also announced as a condition on the part of every patient accepting the services of the Hospital physicians and surgeons “that no payment shall be made for them”; and they were further informed “that no claim of any nature, consequent upon such service, can obtain outside of the Hospital from any member of the staff upon any patient, or from any patient upon any member of the staff who has attended him or her in the Hospital.” The notification added virtually, that “if any patient wishes to express his indebtedness for professional services, the Hospital would be grateful to him for any contribution to its funds, and will apply the money for the benefit of unhappy sufferers whom it would be otherwise unable to receive.” This invita-

tion has been not unfrequently accepted, — once by a patient under Dr. Bigelow's own care, who, in lieu of a surgeon's fee, made a donation of one thousand dollars to the institution.

It was emphatically and repeatedly declared by Dr. Bigelow, that to be associated medically, and especially surgically, with a hospital in high repute is to be indebted to it. He maintained that the position should be regarded solely as one of honor, — each surgeon being fully remunerated by the advantages directly and indirectly accruing from such a connection.

Dr. Bigelow's familiarity with the administration of the Massachusetts General Hospital, and his knowledge of its best interests, had been gained by almost daily visits for forty years, during nineteen of which he was its senior surgeon; and when in the spring of 1885 the well-considered nominations, made according to usage by the surgeons, for appointments to certain subordinate positions were rejected by the trustees, not upon the ground of want of fitness in the nominees, but for reasons which to his mind tended to the prejudice of the Hospital, he began to consider seriously the question of his retirement; and later in the year, admonished by the state of his health, he notified the trustees — whose custom was to elect medical and surgical officers for one year only — that he should not be a candidate for re-election.

Unwilling to lose the prestige which Dr. Bigelow's reputation as one of its surgeons had given the Hospital for more than a third of a century, the trustees

proposed to place at his disposal five beds for the treatment of such cases as he might desire to take under his personal care, and to give him the title of Surgeon Emeritus. This position, instituted for the first time in the history of the Hospital, he was not inclined to refuse. In reply to his inquiry whether his acceptance of it would include him in the Hospital staff, with the right to be present at their meetings, to take part in their deliberations, and to vote as heretofore, he was privately assured that it would do so as a matter of course. With this understanding, he agreed to accept the proffered office. But before their final action a majority of the trustees were induced to modify the proposal as originally communicated to Dr. Bigelow, and to tender to him the use of the five beds with the honorary title, but accompanying this with the statement that he would not be considered one of the regular Hospital staff, and would have no right to participate in or vote at their meetings.

The offer as thus modified Dr. Bigelow at once declined; and his sense of the indignity put upon him, and of the false position in which he was placed by this remarkable change of attitude on the part of the trustees, coupled with his knowledge of the causes by which it had been brought about, embittered for the remainder of his life his relations with the Hospital upon which he had shed so much lustre, and for which he had labored with such diligence, fidelity, and affection during his entire professional career. To his mind this suddenly hostile attitude of the Hospital authorities, after years of harmony, admitted of but

one explanation; namely, that his pronounced opposition to the taking of private fees being neutralized by the loss of his influence and vote as a member of the Hospital staff, the trustees might be successfully induced to rescind their standing prohibition of the practice, and thereafter to countenance the exaction of money from those deemed able to pay the physicians and surgeons for professional services rendered in an institution whose objects were purely charitable.<sup>1</sup>

During the earlier years of Dr. Bigelow's Hospital service his time was largely occupied by the business of a general practitioner. There were then no specialists. He was what he called a "practising doctor," as well as an accoucheur and a surgeon, operating "from one end of the body to the other, — from cataract and strabismus to club-foot and stone in the bladder." He had acquired such prestige throughout New England as to bring his advice in consultation, as well as his skill in operative surgery and traumatic emergencies, into continual demand.

Indebted to no paternal or fostering care for his distinguished clientele, Dr. Bigelow nevertheless owed much of his success to a loyal observance of the doctrines set forth in his father's "Self-limited Diseases," in which Nature is recognized as the great curative agent, and art as only her auxiliary. He appreciated the value of cheerfulness, and was aware of the fact that a medical visit means, in most instances, merely a social visit, which he well understood how to make agreeable. He was no alarmist. He knew how to be

<sup>1</sup> Appendix I., p. 279.



discreetly reticent, and was master of the art of seeming to answer questions satisfactorily. If he was sometimes impatient of long narrations, he never betrayed his annoyance by irritability of word or look, but arrested the tedious tendency with some droll or humorous comment or comparison, which, while it did not give offence, expressed his recognition of the patient's loquacity or petulance.

A characteristic story is told, that a lady, of whom he had long been the physician, sent for him on one occasion for some trifling matter. He sat quietly, and allowed her to talk uninterruptedly for full three quarters of an hour. Then he said: "Well, Mrs. —, as near as I can gather from what you tell me the position of things is this: You have sent for me in order to tell me that you had thought of sending for Dr. A., to ask him whether you had better send for Dr. B.; but that upon consideration you have decided to take a remedy which Dr. C. prescribed for Miss — for a different disease."

"There were two lovable traits," says Mr. Henry Lee, "which endeared Dr. Bigelow to all his patients, simple or gentle, — his untiring devotion, and his reluctance to give pain."

When occasion required he would spend night after night at a patient's house, — the hardest thing a physician does, — and subject himself to any inconvenience if good were to come of it. In the days before abdominal surgery and antisepsis were understood, he once spent an entire night, sitting on the floor, oblivious of his constrained and painful attitude, in unremitting

compression with his finger of a bleeding abdominal artery, which had been divided by a stab, — its ligature being perilous, and digital pressure being the only way in which fatal hemorrhage could then be safely averted.

In one of his addresses Dr. Bigelow uses these words: —

“Science alone is inadequate to the duties of common practice. When the body is diseased the mind falters, and the invalid looks for sympathy, — for heart as well as head, for the philanthropist and not the philosopher.”

On another occasion, in enumerating the qualities of success, Dr. Bigelow conjoins with “a knowledge of men which rules them . . . that natural good feeling which makes one obliging.” He regards “a knowledge of what men want, a readiness to serve them, and an understanding how to do it, kindness, tact, or, more largely, judgment,” as collateral to medical knowledge. He reminds the student that at the hospital bedside “he acquires at once the language of disease and the language of suffering humanity; and, while his scientific sense is educated, his kindlier feelings are developed. He learns to listen patiently, to sympathize, and to re-establish a facility in the manifestation of that tenderness which is generally upon the surface in early youth, but which sometimes gets embedded beneath a stratum of indifference and insensibility.” These are not the sentiments of an unfeeling man, as Dr. Bigelow was sometimes supposed to be by those who had never witnessed his indignation over any manifestation of indifference to suffering, or known the sweetness of his sympathizing smile. His

hatred of suffering was, indeed, almost morbid. He considered pain as the worst dispensation which could beset humanity, — destructive to the affections, changing one's nature, and making death desirable. To quote his own words, "The two great evils of life are ignorance and pain." To relieve this physical evil he believed was the physician's mission.

Dr. Bigelow entertained the unqualified conviction that it is a paramount duty not to withhold the inestimable boon of narcotics in full doses, in the last days or hours of many patients, and that he had no right to stand aside and leave them unaided in the struggles of dissolution. He often said, "Dying is nothing, but pain is a very serious matter." In 1871 he wrote thus: —

"In a practice of twenty-five years I have never intentionally given a patient, unless by his own choice, any pain without narcotization; nor have I allowed a patient to die a painful death when opium would lull him into his long sleep. I share the responsibility of this with the surgeon who walked about the battle-field, distributing morphine to those who were hopelessly wounded, and with the soldier mentioned by Ambroise Paré, who did more."

According to the "Boston Medical and Surgical Journal" of May 7, 1891, Dr. Bigelow gave a young woman, twenty years old, slowly dying from an inoperable sarcoma of the leg, 2,024 grains of morphine in five weeks, the largest single dose being one hundred and twenty grains; and one hundred and eighty grains were once given, in two doses, within forty minutes.

Full of kindly instincts, Dr. Bigelow hated to render any one an account for professional services. His

medical bookkeeping was of a most primitive character, and he paid but little attention to the indebtedness of his patients. Personally, he was adequately compensated if his pleasure in performing a humane and friendly office were only silently recognized and appreciated. Any association between medical practice and the art of money-making was repugnant to him, and a sense of professional duty was almost his only motive for sending out his long delayed bills at all. It may be added that he was rarely the recipient of large surgical fees. His conservative judgment recoiled from charges such as were sometimes brought to his notice, and which seemed to him exorbitant. During his visit to London, in 1881, he was importuned to perform the operation of rapid lithotomy upon an eminent person high in professional position, and on several occasions he was urged to go abroad for surgical purposes; but even the unlimited compensation offered could not induce him to comply with these requests.

One of Dr. Bigelow's patients writes:—

"I had two little children who were taken sick simultaneously with scarlet fever,—one in Boston, and the other at a school in Northboro'. Knowing my position, he came to me one day and said, 'Now, S——, I want to go and see how that child at Northboro' is.' 'Well,' I said, 'I shall be delighted if you will.' It was in the depth of winter. Snow covered the tops of the fences, and I was surprised at his proposal; for you remember how sensitive he was to colds, and how carefully he protected himself from pulmonary disorders. But I was mighty glad to have him go, and off he started.

"He drove at night,—a very cold night,—in an open sleigh, from Framingham to Northboro', twelve miles. He stayed



at Northboro' that night, came back the next day, and reported to me that he found the child getting on as well as could be expected; that the attending physician was qualified for his position, and that I might make myself perfectly easy. When the first of January came, of course I expected a bill; but no bill came. After perhaps ten or twelve days I wrote him a note to say that if he had sent me a bill I had not received it, and I put inside the note a signed check, in blank, for him to fill up. The next day he came to my office, and throwing the check, unfilled, down on my desk, said, 'Good heavens! S——, you don't suppose I ever made such a journey as that for money, do you?' I think this incident is illustrative of his character."

The drudgery of practice was distasteful to him. He often remarked that one case of sickness which called for three visits between morning and night, fatigued him more than all the remainder of his day's work. His occupations moreover were often so absorbing, that, even when at home, it troubled him to be interrupted by those who called at his house for advice; yet if the applicants came from a distance, or were his friends, he was unwilling not to receive them. Then, again, when his thoughts had long been engaged in one direction, his health and strength felt the strain; so that mere prudence often compelled him to drop everything, sometimes without warning, and absent himself for rest and recreation. He felt also that in many details the interests of an acutely sick person, or of a chronic invalid, were often better subserved by a physician of different temperament from his own.

From an early period of his busy life Dr. Bigelow therefore associated with himself younger colleagues, upon whom he could depend, and whose congenial

assistance he could at all times invite. To them he relinquished many patients, but always with a discriminating judgment as to the requirements of each case. He thus successively helped several young men into the higher walks of professional practice. This he did with the same zeal which marked all his other undertakings. Says Dr. Hasket Derby, in his Memorial Address, —

“He claimed no gratitude, he allowed no thanks. His generous favor was always accompanied by an amiable personal interest, which was one of the hidden traits of Dr. Bigelow’s character, and of which only the few who best knew him were aware.”

In co-operating with his fellow physicians Dr. Bigelow was punctilious and dignified, — mindful of their individuality, and independent of all influences save those of duty, honest conviction, and self-respect.

As a member of a committee appointed by the councillors of the Massachusetts Medical Society to prepare a code of ethics for the guidance of its members, — believing that his profession stood on an honorable foundation, and that if a physician were not influenced by high motives, and did not possess the instincts of courtesy, no ethical code, least of all one with details adapted to “the times of rapacity when men fought in the consultation room,” could implant them in his mind, — Dr. Bigelow prepared, in an orderly digest of great merit, a brief and simple system of rules for regulating the actions and indicating the duties of medical men. This he presented as a minority report, — a minority in which he stood alone.

Its adoption was voted by fifty-four yeas to nineteen nays as a substitute for a compendium, very minute in its provisions, offered by the majority of the committee, and urgently pressed upon the councillors.

To obey the Golden Rule and to be a gentleman are the sum and substance of Dr. Bigelow's code, and the following extracts indicate its pervading tone: —

“I. *The Relation of the Physician to Medical Science.* — A physician should lend his influence to encourage sound medical education, and to uphold in the community correct views of the power and the limitation of medical science and art.

“II. *The Relation of the Physician to his Patients.* — The first duty of the practising physician is to his patient, who has a right to expect that his disease shall be thoroughly investigated and skilfully treated, with charitable consideration for his mental peculiarities or infirmities, and in a relation strictly confidential.

“III. *The Relation of the Physician to other Practitioners and to their Patients.* — In his relations with another medical practitioner and his patients, a physician should be governed by strict rules of honor and courtesy. His conduct should be such as, if universally imitated, would insure the mutual confidence of all medical practitioners.”

In common with other physicians, Dr. Bigelow was often annoyed by the receipt of articles, — sometimes in embarrassing quantities, or having an equally embarrassing money value. — sent by their manufacturers or vendors in the hope of securing a commendatory letter which might be of service to them in advertising. To one of the most persistent of these — a dealer in wines for medicinal use, and a foreigner — he wrote as follows: —

“Don’t send me any more wine. We have a code of medical ethics here, which I wrote myself, prohibiting any medical man from publicly puffing any such thing,—that being the shortest way to prevent all medical men from puffing all such things,—whether ‘mineral waters, patents, medical preparations, or the like,’ and so lending their aid, in public advertisements, to weaken the distinct line between the regular practice of medicine and the practice of quackery,—a line more difficult to establish in this country than abroad, because the law relating to it is far less strong here than there. Besides, at the price you affix to some of this wine the obligation incurred by the present of a box of it does not leave one free to do otherwise than speak civilly of it. However, your system of advertisement is a liberal one, and I am a conservative.

“I heartily reciprocate, in wine which I have paid for, the Christmas greeting you are kind enough to send me. I forwarded your two previous boxes to the Massachusetts General Hospital, and shall do the same with this one, unless you prefer some other disposition to be made of it,—of which please notify me.”

On May 8, 1847, Dr. Bigelow was married to Susan, daughter of Hon. William Sturgis, of Boston, and soon after began housekeeping at No. 5 Chauncy Place, where he lived until 1864, when he removed to No. 52 Beacon Street, which thereafter remained his Boston residence.

Mrs. Bigelow died June 9, 1853, leaving a son, now Dr. William Sturgis Bigelow, born April 4, 1850.

Mrs. Bigelow’s charm of character was acknowledged everywhere. Possessing great personal beauty, intellectually gifted, bright with ready wit,—which sparkled in verse and correspondence, and still lives in



treasured sketches, — she carried sunshine with her wherever she went. With a certain nobility of nature inherited from her father, she did her whole duty in life spontaneously, cheerfully, winningly, because inclination kept equal pace with duty. Devoted and self-sacrificing, she entered with her whole heart into the joy or grief of her friends, and made her very own the individual story of each poor person who was the recipient of her bounty. Her simple creed consisted in doing even the smallest thing aright.

The graces of Mrs. Bigelow's womanly character have been commemorated by her friend, Mrs. Mary Eliot Parkman, in loving and genial words: —

“ Brilliant in mental gifts, she was still more remarkable for her qualities of heart, her wide sympathies, her loyal affections, her almost unequalled power of disinterested devotion to others. These were as the very light of her life, fervent, unvarying, unfaltering. With the circle nearest to her she seemed so to identify herself as to throw all the fervor of her own nature into sympathy with their interests. Beyond this, there were very many who opened to her their hearts, almost instinctively confiding their hidden fears or hopes to one whose delicate perceptions responded so truly; while to those whom we have always with us, the poor, she gave not only alms, but the deep friendliness which showed a rare apprehension of their individuality.

“ In society her manners had a delightful directness which shamed conventionality, while it charmed those most exacting in conventional propriety. What most of us must be trained to do was spontaneous with her; and old and young rejoiced to meet one whose fresh gayety sprang from a frank and generous nature. While she had remarkable intellectuality, great originality, and the genius of presenting common thoughts with the force and charm of novelty, she was

entirely free from intellectual pretension. She never rated herself among the gifted, but felt a loving admiration for minds of a quality inferior to her own. Childlike in her unconsciousness, she was childlike also in her purity of heart, in her devoted affections, in her spontaneous mirth.

“Peace be to her delightful memory ! The sunshine is darkened to many who hoped she would light the paths of their lives ; but for her there is light everlasting, and on her rest the blessings promised to the pure in heart.”

Having thus sketched the more distinctly professional part of Dr. Bigelow's life, especially in connection with the Hospital, it is now necessary to turn back to his earlier years, and record the still more salient episodes of his career which distinguished him as teacher, author, and public benefactor.

As early as 1838, the older physicians of Boston recognized the fact that the methods of medical education then in vogue, outside the lecture courses in medical colleges, were insufficient and unsatisfactory. As an improvement upon and a substitute for tuition in a physician's office, a private school was organized in September of that year, in which systematic instruction by recitations and demonstrations, as well as lectures, was to be given at stated hours throughout the year, in rooms specially equipped for these purposes, by teachers known to be identified with the different departments of medicine and surgery. Starting with seventeen pupils, and called, from its location, the Tremont Street Medical School, it soon acquired great prestige. Its mission lasted until 1858, when it was taken under the fostering

care of Harvard University as a Summer Medical School; and in 1871, upon the establishment of a graded course providing for continuous instruction throughout the year, the school was finally merged in its Medical Department.

The originators and first teachers of the school were Jacob Bigelow, D. Humphreys Storer, Oliver Wendell Holmes, and Edward Reynolds. Subsequently the number of instructors was greatly increased.

In this school the younger Dr. Bigelow began his long career as a public teacher, being appointed its Instructor in Surgery and Chemistry in 1844. The latter branch remained in his charge only a few years, but he was teacher of surgery in the school as long as it lasted. With a strong conviction of the beneficial effects of teaching upon the teacher himself, he entered with his habitual zeal upon the work which this opportunity afforded, and exhibited the same energetic interest here which afterward characterized his relation to the Medical School of the University.

Among Dr. Bigelow's earliest efforts in behalf of the Tremont Street students was the delivery of a course of lectures on Hernia, illustrated by diagrams, dissections, and cases, prepared and set forth in an elaborate manner. The locality of the school being unsuited to this project, Dr. Bigelow hired a small house contiguous to the Harvard Medical College in North Grove Street, and, by removing the partition between two rooms in the lower story, arranged a reasonably convenient space for a lecture-room.

The hour chosen for his lecture being the one devoted by the Medical School to Chemistry, — then an uninteresting subject to most students, — Dr. Bigelow had no difficulty in obtaining large audiences, drawn mainly from the lecture-room next door. The resignation of Professor George Hayward, however, was about to take effect. Dr. Bigelow was already regarded as his probable successor; but the disturbing popularity of this new enterprise, beneath the very eaves of the Medical School, seemed likely to interfere with the friendly concurrence of some members of the Medical Faculty in his preferment. Only two or three lectures, therefore, were given in these compromising quarters, the course being transferred to the already famous Chauncy Place Infirmary, where it went on to completion with undiminished approval.

In 1849, though hardly more than established as a practitioner and hospital surgeon, Dr. Bigelow received his appointment as Professor of Surgery in Harvard University. His surgical ability was generally acknowledged. His interest in teaching and his capacity as a teacher had already been manifested. It was known also that since his return from Europe he had been busy with researches in surgical pathology, and that he was a microscopist superior to any in Boston, and second to none elsewhere in the United States at that time. It might be said that he was without a competitor for the high and honorable position to which he was chosen at the early age of thirty-one years.



Convinced that knowledge was to be gained only by investigation, — that new facts could not be obtained in pathological anatomy, the subject wherein his scientific interest was centred, except by continuous and precise use of the microscope, — Dr. Bigelow provided himself with the finest instruments and objectives which could then be obtained, as well as with various appliances suggested by his own ingenuity or experience, that he might be thoroughly equipped for this comparatively novel line of inquiry. Among a number of microscopes, the one he chiefly used was a large instrument made by Ross, — a monumental piece of intricate mechanism, nearly two feet high, which would contrast strangely with the compact simplicity of microscopes of the present time. To a variety of lenses he added those made by Spencer, an American, then just coming into notice, whose objectives of high power were regarded at the time as unequalled even across the ocean.

Constantly at work with the microscope, Dr. Bigelow experienced inconvenience in changing objectives rapidly, — an inconvenience made doubly great by the habit which makers at that time had of putting a fine and long thread on the coupling. To meet this difficulty he devised a revolving brass carrier, — the original, made by Alvan Clark, is still in existence, — to which three objectives were coupled and so adjusted that either of them, on being swung into position, came into exact focus. This was in 1850; but the piece of apparatus afterward found its way into the catalogues of English microscope makers,

under the name of "Brookes's nose-piece." Of late years it has become a part of the outfit of first-class instruments all over the world.

Dr. Bigelow was fortunate in obtaining the exclusive services of Mr. Oscar Wallis, an artist of great skill and patience in drawing and coloring. Having instructed him in the peculiar and exceptional work now called for, the days of these two men, and it might almost be said the nights also, were spent in microscopical investigations, — in recording careful descriptions of pathological specimens, and in depicting their general appearance as well as their minute anatomy. In Mr. Wallis's early efforts a difficulty was experienced in representing the cut surface of a tumor so as to give its varying colors and texture, and especially its translucency, without producing an unintended effect of relief. This was eventually overcome, after long practice under Dr. Bigelow's direction in painting sections of white and purple grapes.

These drawings, reproduced in a permanent form by means of lithography and then colored by Mr. Wallis, were designed to serve as illustrations for an elaborate volume on surgical pathology — more especially in reference to tumors — which Dr. Bigelow had in contemplation. Several years were spent upon this work. While it was still unfinished, Lebert's "*Traité d'Anatomie Pathologique, Générale et Spéciale*," made its appearance, with its magnificent Atlas of illustrations, in two volumes.

Finding himself thus forestalled in his enterprise by the superior facilities for similar work at the ready

command of a French scientist, Dr. Bigelow at once abandoned the project to which he had devoted so much time and thought, and to the completion of which those acquainted with the undertaking had looked forward with supreme expectation. In spite of his disappointment, however, he never ceased to regard the knowledge acquired in this labor as invaluable. In later years he delighted to recall these studies, and to point out the observations he had then made.

Mr. Wallis was at this same time also engaged on a series of large colored diagrams, many of them original, and drawn from actual cases and specimens, while others were copied from surgical authorities, which were to be used for the illustration of Dr. Bigelow's lectures at the Medical School. These diagrams, the preparation of which cost some six thousand dollars, — together with many of the smaller lithographic impressions originally intended for publication, — were presented to the Harvard Medical School in 1890, and placed in charge of Professor R. H. Fitz, "to be used in the school building only, and as he may direct." In a personal letter, Dr. Bigelow says: "My early impressions in regard to the connection between pathological anatomy and surgery will explain the number of diagrams illustrating that subject. They were made between 1849 and 1854."

In the memorial number of the "Boston Medical and Surgical Journal" for November 27, 1890, Dr. Fitz describes these early investigations of Dr. Bigelow in terms similar to those here used; and after speak-

ing of the colored drawings intended to have been published, he says: —

“What these illustrations would have been is in part known to the generations of Dr. Bigelow’s students, who have admired, each in their turn, the magnificent diagrams with which he illustrated his lectures on surgery. The beauty of some of these pictures is so conspicuous, in virtue of color and outline, that one forgets the repulsive nature of the subject, and simply admires the skill of the artist. No one gave the latter more credit than did Dr. Bigelow. Within a few months, when he gave his collection to the Harvard Medical School, he stipulated that each should bear the name of the artist, which has accordingly been indelibly impressed upon them.

“The original drawings are those which possess the highest artistic merit, but those reproduced from various other sources are often interesting. Among these is an enlarged copy of an illustration from Addison’s paper, showing the emigration of the white blood-corpuscles, the rediscovery of which, many years later, has made the name of Cohnheim imperishable. That Dr. Bigelow should have sufficiently appreciated the importance of this observation to have made it the object of illustration forty years ago, is truly noteworthy.”

By the aid of this complete equipment, covering the whole range of surgical subjects and supplementing his own strong qualifications, Dr. Bigelow greatly enhanced the repute of a professorship in which for thirty-three years — from 1849 to 1882 — his lectures were a distinctive element.

The prevailing feature of Dr. Bigelow’s instruction was the inculcation of the principles underlying practical surgery. “No single branch of education,” was his constant remark, “is more essential to the medical



student than pathological anatomy, the corner stone of medicine." He was profuse in demonstrations, both with living and dead subjects, often making rapid dissections in the presence of the class. He was ingenious in contrivances representing the mechanical phenomena attending disease and injury. He was a rapid and effective draughtsman, and could often convey ideas on the blackboard more vividly than in language. When the lecture-rooms of a new building for the Medical School were being fitted up, Dr. Bigelow made the following interesting comments on the uses of blackboards:—

"We hear, of late, talk about blackboards, and their value in teaching; but they have value only when the pictures are good. Bad drawings are of but little use to the student; he had much better look at his text-book figures during lecture than at crowded and stiff drawing, — even in colored chalk.

"The *blackboardism* which seems just now to prevail in this locality is: (1) an extended syllabus of the lecture, written out over a large surface, which, except in chemistry, is likely to interfere with the perspective of the subject by bringing all its divisions forward into the same plane; and (2) an elaborate and confused diagram, laboriously prepared beforehand.

"A blackboard is legitimately used to explain and elineh ideas as the lecture goes on, with sketches, local and rapid, showing in concrete form what the lecturer is talking about at the moment, — one figure replaeing another when the idea does. This has been the practice of experts like Agassiz, Morse, and Rimmer, and needs a blackboard of only moderate size.

"Drawing requires, of course, a certain practice. A lecturer who has such education will avail himself of it to great advantage; but if he has not the faeulty of drawing, you

might as well advise him to avail himself of eloquence or clearness or conciseness or personal magnetism. One man can do one thing, and other men another. There are many kinds of good lecturers, and a lecturer had better develop his own kind.

“For myself, little as I know about drawing, I have probably done as much blackboard drawing as anybody in our School, but always in the way I have indicated, — on a small scale, — to complete other illustrations, and at the moment it is called for.

“Good illustration is invaluable; it is the real thing instead of words. I was so persuaded of this when I began to lecture that I had pictures made at any sacrifice of time and money. My diagrams were then the best in existence; so far as they went, they were useful.

“You have got a limited flat wall, which you have chosen to devote to a gigantic blackboard. This prohibits any other means of illustration. At present the theoretical notion of the blackboard seems to carry the day, without much regard to the quality of any medical statement or drawing made upon it.”

Although never straining after oratorical effect, Dr. Bigelow possessed the power of distinct, definite, and earnest utterance, frequently adopting terse and homely Anglo Saxon phrases to enforce his meaning. He had the faculty of condensation in a remarkable degree, and of concise and clear expression, which emphasized the essential while disregarding the unimportant elements of a proposition. He never entered into all the possible details and complications of an injury or disease, but went straight to its material points, striving so to describe each of them as to fix it in the pupil's memory. Neither was there any attempt to cover the whole ground of surgery. On the contrary, much was

omitted, or passed lightly over. He followed no prescribed order, save when a class of subjects — fractures, for instance — was under consideration, but chose his topics for their importance and practicality, rather than because they must be included in a conventional course of lectures.

Dr. Bigelow understood the needs of students, and by his habit of selecting what was most useful, and presenting it simply, clearly, and without complicating accessories to obscure his statements, he drove home even to sluggish minds the desired lesson. Thus he secured the attention of his hearers from beginning to end, interesting indifferent listeners as well as keen inquirers. He was as earnest in dealing with a varicose ulcer as with an amputation at the hip joint, — giving infinitely more attention to those comparatively trivial subjects which he knew would prove to be practically useful in the future. In his lecture on injuries of the elbow joint, for example, he would carefully describe the various possible fractures and dislocations, and then, in brief recapitulation, would say: “If the olecranon is broken, put the arm on a straight splint. In all other injuries of the elbow joint, go through the motions of reducing a backward dislocation of the forearm, and apply an internal angular splint.” In these few words the essential rule in the treatment of fractures of the elbow joint was indicated. The pith of the subject was put in a form so compact that its very dryness made it easy to carry away and keep.

Probably few lecturers ever left more lessons indelibly fixed in the memory than did Dr. Bigelow. It has

been justly remarked of his instruction, that many a physician is to-day helped safely through surgical dilemmas by some of his brief precepts. In not a few cases of imperfect diagnosis, a stiff joint has doubtless been prevented by the recollection of his axiom for the treatment of elbow fractures.<sup>1</sup>

No listener ever failed to appreciate the force and originality of Dr. Bigelow's teaching. His lecture-room was always crowded. His demonstrations not unfrequently elicited applause for their neatness or originality, sometimes for their unexpectedness. He was humorous, and would often introduce an effective anecdote; but pleasantries were not every-day features of his lectures. He never spoke as a man of surgical achievements; nor did self-laudation or exaggeration mar the reports of his own cases. Nevertheless, his students regarded him as the epitome of surgical knowledge; and if they desired information, all they had to do, they thought, was to ask him, believing that whatever he said was sure to be right, even though the books might say something different.

Dr. Bigelow's power as a teacher was nowhere better exemplified than in clinical lectures. The utilitarian bent of his mind is shown in the various notes of such lectures as were published from time to time, usually by his house surgeons, but always with his own revision. Many of these had reference to common and homely incidents of surgery, — varix, hydrocele, fistula, abscess, felon, anaesthetics, catheterization,

<sup>1</sup> See Dr. A. T. Cabot's Memorial Article in the "Boston Medical and Surgical Journal" of November 27, 1890.



and the like, — subjects upon which he held definite opinions that he believed could not be specified too explicitly before students, most of whom were likely to become country practitioners. “In the education of practitioners,” he said, “it should be the aim to develop good judgment, by a reiteration of undisputed facts in their simplest expression, and by a constant reference of these facts to such broad principles as can be demonstrated beyond reasonable doubt.” There is no more felicitous illustration of the style of Dr. Bigelow’s lecture than an abstract of a clinical lecture on the treatment of Fractures and Dislocations of the Elbow Joint, to be found in the “Boston Medical and Surgical Journal” of May 7, 1868.

With the prevention of pain always in mind as a vital requirement of humane practice, Dr. Bigelow insisted upon its avoidance by every available means in determining the character of any surgical affection. It has already been remarked that nothing disturbed him more than to witness the needless fingering of a sensitive region. It was his constant effort, therefore, to instruct students in the art of diagnosis by sight alone, — to make it plain, for example, that the characteristic deformity of a Colles’s fracture, of a dislocated shoulder or hip, or of a broken neck of the thigh bone, told the whole story of the injury, and that little or nothing of value was to be gained in such cases by a manual examination at the cost of suffering. If more information was desirable than could be obtained by simple inspection, the patient should be put under the influence of

ether; and even then manipulation should be reduced to its lowest possible terms.

The frequent disablement of working-men by inadequately treated felons appealed strongly to Dr. Bigelow's sympathies, and led him, whenever opportunity offered, strenuously to denounce insufficient incisions ("medical incisions" he termed them), in contradistinction to those of true surgical completeness. In his own words: "Long, or at least competent, incisions give no more pain than short ones. They heal as quickly; and, more than that, they do their intended work without need of repetition." Decisive and direct action was what he aimed to teach, as well as attain.

It has already been remarked, and may well be repeated, that Dr. Bigelow's instruction was never so elementary or so entirely practical as to encroach upon his teaching of the higher and the purely scientific and pathological details of surgery. His own refinements in surgical research and treatment owed much of their development to his discussion of them before his classes, in the lecture-room, the hospital, and the amphitheatre.

To a man of Dr. Bigelow's inquiring instincts, his position as a teacher opened unbounded facilities for investigation. Daily contact with anatomical and pathological specimens, and the annually recurrent consideration of the same topics in his lectures, never caused him to degenerate into mere routine. It was his habit to make a regional dissection, preparatory to any exceptional operation, and to study the best

methods of access to such deep-seated localities as occasion might require him to penetrate. He continually placed an old fact in a novel light, and new ideas were thus generated in his own mind. Many original observations and improved devices grew out of his demonstrative lecturing, — as, for example, his exposition of stellate fracture in the lower extremity of the radius, the mechanism of impaction in fractures of the neck of the femur, the treatment of ununited fractures, and of stricture of the urethra, not to mention the two great discoveries by which he became so widely known, the treatment of calculus and the mechanism of hip dislocations. His sagacious eye was quick to take a hint from Nature. Not only did he see things which others had passed unnoticed, but he followed up their suggestions.

A median section of the head and neck was every year shown by Dr. Bigelow to his students, as offering a field full of practical instruction, and one especially attractive to himself, not only from its intrinsic anatomical importance, but by reason of his interest in cleft palate, to the treatment of which at one time he had given a great deal of thought. In a certain case of this deformity, his attention was drawn to the excessive turgescence of the mucous membrane of the inferior turbinated bone, and still more to its sudden collapse while actually under observation, “like the lung of a small animal,” as he said. His repeated scrutiny of the section just mentioned led him — from having this incident in mind — to one of the very few additions to human descriptive anatomy made in this

country, and which he recorded in the "Boston Medical and Surgical Journal," in 1875, under the title of "Turbinated Corpora Cavernosa."

This new anatomical observation offered a simple and satisfactory explanation of the features of what is popularly known as cold in the head. The suddenness with which the nasal air-passages become obstructed, and the equal suddenness with which they are cleared by a swallow of water, a pinch of "catarrh snuff," or a sudden mental or physical start,—though the trouble as speedily returns,—had naturally suggested the idea that some kind of congested mucous membrane was concerned in these familiar phenomena; but it remained for Dr. Bigelow to discover that the turbinated bones are imbedded in a spongy tissue, made up of large cells capable of being rapidly filled with blood and as rapidly emptied,—an erectile tissue, in short, resembling that of the corpora cavernosa, as the title of his monograph implies. A method now sometimes adopted for the cure of autumnal and other catarrhal affections is the destruction, by cautery, of this cavernous structure.

Dr. Oliver Wendell Holmes, narrating these facts, says:—

"This discovery showed that Dr. Bigelow looked with his own eyes. Thousands of keen-eyed anatomists had been over the human body to find something that no one else had ever noticed. All that region had been examined by tens of thousands who had never pointed out that peculiar structure. It takes the born discoverer to do such work,—the man who cannot be satisfied till he gets to the bottom of things."



A reprint of Dr. Bigelow's paper on Turbinated Corpora Cavernosa was presented by an American physician, with a natural pride in original native researches, to Herr Zuckerkandl, — a Viennese Jew, Prosector of the Wiener Anatomische Institut, and an able privat-docent in anatomy. Having verified Dr. Bigelow's discovery, Zuckerkandl made it public as the result of his own researches, with no allusion whatsoever either to his informant or to the original discoverer.

Beginning with 1854–55, Dr. Bigelow had been in the habit of demonstrating annually before his class in the Medical School the usual dislocations of the hip, using upon each occasion one and the same dead body for all the demonstrations. Notwithstanding the great laceration which the capsule of the joint underwent, the subject always exhibited the expected and well recognized attitudes of the several dislocations. The fixed postures of the limb — the persistency of which, under the circumstances, Dr. Bigelow regarded as at least a curious fact — were naturally attributed to the muscles; and he took it for granted that the action of their complicated mechanism would hardly repay the labor of its study. In the spring of 1861, however, having been led to expose a hip joint, the luxations of which had just been lectured upon, he noticed that the muscles were extensively ruptured, the ligamentum teres broken, and the entire capsule torn away, — with the exception of the anterior part, which presented, in an uninjured condition, a strong, fibrous band, fan-shaped and slightly forked. His attention

being thus attracted to this band, he quickly perceived its simple action, — a simplicity which his subsequent investigations confirmed, — and was soon convinced that it not only explained the phenomena of dislocations observable in living subjects, but was also the key to the reduction of those dislocations.

In June, 1861, Dr. Bigelow read a paper before the Boston Society for Medical Improvement, in which he unravelled much that was previously obscure in the complicated details of hip dislocation. In May, 1864, he read a second paper on the same subject, before the Massachusetts Medical Society, accompanied by an elaborate demonstration; and a third in June, 1865, before the American Medical Association. In 1869 he published a volume entitled “Mechanism of Dislocations and Fracture of the Hip, with the Reduction of the Dislocations by the Flexion Method.”

It will therefore be seen that Dr. Bigelow was engaged from 1861 until 1869 in researches connected with dislocation of the hip, and that he did not hasten into print with his discoveries, but waited until completely satisfied with the correctness of all their details. During this time he made no secret of these investigations, but took pains to give the benefit of them to the entire profession, as well as to his students.

The main features of his observations may be summarized as follows.

Dr. Bigelow was the first to draw attention to the great strength of the anterior part of the capsule of the hip joint, and to determine the relation of the ilio-femoral ligament to dislocations of the hip. Although

the fan-shape and the two fasciculi of this ligament had long ago been alluded to by Winslow and others, Dr. Bigelow first defined with precision its diverging bands; and from their resemblance to the branches of an inverted Y gave it, for the sake of brevity and convenience, the new name of the Y ligament, by which it is now almost universally known. He discovered that, so long as this ligament remained unbroken in one or both of its branches, it determined the established features of all the dislocations of the hip joint. He also demonstrated that it was the chief obstacle to their reduction, the muscles playing only a subordinate and occasional part in giving position to the limb, or in hindering reduction. Upon it he founded his exposition of the mechanism of hip dislocations, his system of classification, and the details of treatment.

Dividing hip dislocations into two classes, Regular and Irregular, he described regular dislocations (seven in number, four of them being new varieties) as those in which, one or both branches of the Y ligament remaining unbroken, the head of the femur is thereby held near the acetabulum in some one of seven positions, the signs of each of which are necessarily constant. The irregular dislocations are those in which, the Y ligament being wholly ruptured, the head of the femur is no longer held in any fixed relations to the acetabulum, but left free to move in all directions. The signs of these dislocations are therefore inconstant.

Dr. Bigelow then proceeded to show that, in all regular dislocations, manipulation of the Y ligament will

effect reduction; and that the cardinal point of this manipulation is *flexion of the thigh upon the pelvis*. This becomes efficient because it relaxes the Y ligament, and hence the name of Flexion Method, given to this process of reduction. The Y ligament being flexed, and therefore relaxed, the head of the femur can then be guided in the desired direction by traction, which disengages it from its false position, and directs it to the socket; or by rotation, which winds the Y ligament, as it were, around the neck of the femur, shortens the former, and thus compels the head of the bone, as it sweeps the rim of the acetabulum, to approach so near that it can easily be lifted into the socket.

In the irregular dislocations, both branches of the Y ligament being ruptured, and the head of the femur having lost the guidance of its powerful fibres, practically nothing interferes with its direct traction toward the socket, although its retention there may prove a matter of difficulty.

The limited knowledge of surgeons in regard to the mechanism of dislocations of the hip, or of their reduction, before Dr. Bigelow's observations were made, is alluded to by Dr. A. T. Cabot, in the Memorial Number of the "Boston Medical and Surgical Journal," November 27, 1890, wherein he says: —

"It was only known that the most powerful traction, in what seemed to be the right direction, often failed to reduce a dislocation of the hip; while occasionally manipulation in a more or less aimless way accomplished a reduction with a comparatively slight exercise of force. It remained for Dr. Bigelow to penetrate the mechanical mysteries of this joint, to discover the action of the Y ligament in shaping the deform-



ity of the limb, and to show how this band of fibres, which had so often frustrated the most violent efforts of the surgeon, could, when rightly understood, be made to assist in reduction, and guide the displaced bone back into its socket."

Reduction of hip dislocation by flexion dates from a remote period. In recent times Professor Nathan Smith, of Baltimore, Dr. W. W. Reid, of Rochester, New York, and others, had reduced dislocations by flexion; but they could not explain the philosophy of the successful manœuvre, except by an unfounded theory of muscular resistance. The world was rendered no wiser by their experience. The process could not be purposely repeated, though it might be duplicated accidentally, or by what sportsmen call a *fluke*.

By reason of Dr. Bigelow's intricate, patient, and comprehensive investigations, covering a period of more than seven years, the stubborn and brutal pulleys for longitudinal extension — by which the body subjected to their terrible agency was sometimes literally drawn asunder — have become idle paraphernalia. The formidable subcutaneous surgery occasionally practised has also been banished from usage, — as bleeding *ad deliquium*, and the deathly flaccidity provoked by tartar emetic were, by the discovery of anæsthesia, — while the random, ill devised, and fruitless manipulations of former days have been converted, by the clear conception of what is to be done, into accurate, well directed, and successful measures of relief.

At one time Dr. Bigelow was almost afraid he should be unable to accomplish his task, the labor

involved in exact and exhaustive inquiry was so great, and the detailed delineation by woodcuts required so much supervision; but his indomitable energy, together with the spirited assistance of his friend, Dr. H. H. A. Beach, finally overcame all obstacles.

A few months after the publication of his lucid account of these researches, Dr. Bigelow felt called upon to defend the originality of his observations in the "Boston Medical and Surgical Journal" for January 27, 1870, against a claim of the "Chicago Medical Examiner" for January 1, 1870, that Professor Moses Gunn of that city, by an article printed in 1853, had anticipated him in his discovery of the action of the Y ligament. Professor Gunn's reclamation was based upon certain vague observations and dissections of the capsular ligament, made during that year; but the errors and inconclusiveness of these were plainly indicated in Dr. Bigelow's reply.

At a later date Mr. Henry Morris, of London, — in a paper read before the Royal Medical and Chirurgical Society, and published in the "British Medical Journal" for February 17, 1877, — took exception to certain points, chiefly anatomical, in Dr. Bigelow's theory of hip dislocation and its treatment.

These exceptions were analyzed by Dr. Bigelow at a subsequent period in a rejoinder reviewing the whole subject, and printed in the London "Lancet" for June 15, 22, and 29, 1878. In this elaborate article he met the criticisms of Mr. Morris, and maintained and substantiated the opinions he had expressed in his published volume.

Dr. Bigelow's practical conclusions in regard to hip dislocation, — an accident so formidable as to have been, hitherto, the dread of surgeons, — stirred the admiration and interest of the whole profession, particularly of those of its members who witnessed his conclusive demonstrations upon the dead subject. The exactness of his facts and the correctness of his opinions have remained unmodified by criticism, and are unimpeached by the experience of twenty-three years which have elapsed since their promulgation. His woodcuts and text have been made use of by almost every recent work on surgery.<sup>1</sup>

At the close of Dr. Bigelow's Mechanism of Dislocations is a brief but carefully conceived and illustrated chapter on Fracture of the Neck of the Femur. The originality of this discussion, were it not overshadowed by the more striking observations on dislocation, would have attracted in every quarter the attention which it has received in Boston and its vicinity, where his views have been substantiated over and over again, in the Hospital, in the lecture-room, in societies, and in consultations.

Dealing with an accident of common occurrence, which he had studied in his ingenious and persistent way, Dr. Bigelow again introduced light and order where before were only obscurity and confusion. The

<sup>1</sup> Dr. Bigelow's monograph was translated into German, and published in Berlin, in 1873, by August Hirschwald, under this title: "Mechanismus der Luxationen und Fracturen im Huftgelenk, von Dr. Henry J. Bigelow, mit Bewilligung des Verfassers in's Deutsche übersetzt von Dr. Eugen Pochhammer, mit 52 Holzschnitten."

diagnosis of impacted fractures of the neck of the thigh bone, and the propriety of his comprehensive inclusion of all fractures in that locality under this head, — except “the fracture of old age,” in the middle of the cervix, — will never be matters of doubt in the minds of those to whom he taught his simple rules for the recognition and treatment of such injuries. The unimportance of certain distinguishing marks — which have been laboriously described by surgical writers as characteristic of fractures “within” and “without the capsular ligament,” so called — are set forth in plain language. Dr. Bigelow contends that this traditional discrimination cannot be maintained; and that in all impacted fractures recovery may be reasonably expected, with a bony union of the separated parts.

Of Dr. Bigelow’s frequently aphoristic way of putting an important principle, one compact sentence deserves to be instanced, wherein, speaking of the symptom eversion of the limb, he says that *inability to invert is eversion*. A practical paragraph may also be quoted. After having stated that it is a matter of little consequence — either in the treatment, which in all cases is similar, or in the prognosis of the injury — if the so called varieties of fracture of the neck of the femur cannot be distinguished from one another, he remarks that the importance of this distinction is not sufficient to justify any protracted and considerable examination: —

“Flexion of the thigh, its repeated rotation, or other unscrupulous or unskilful handling, is liable to lacerate the remain-



ing capsule, to displace the bony fragments, or by loosening and detaching an impacted fracture to render its union more difficult; — adding, perhaps, to the accuracy of the diagnosis, but directly diminishing the chances of the patient.”

Dr. Bigelow’s minuteness of investigation is revealed in his descriptions of the relation of the trochanters, and their intervening ridge, to the neck of the femur; of the structure of the latter; of the sources of its weakness, especially in its posterior wall; and of the arrangement of bony plates radiating into the spongy tissue, by which the *true neck* is strengthened; — but, without a reproduction of its numerous illustrative and original woodcuts, and of the crucial cases reported, it is impossible to give even a *résumé* of this invaluable essay.

When the operation of lithotrity was first introduced, some seventy years ago, — mainly by the instrumentality of Civiale, of Paris, — it was believed that the terrors of lithotomy were relegated to the past. Gradually, however, it was discovered that lithotrity itself was not without dangers and disasters. In 1877 the large practice of a few English surgeons made it possible to collect valuable statistics as to the different modes of operating for stone in the bladder, and to compare lithotomy with lithotrity. This inventory indicated that the prestige of the latter was about to wane.

The perfection of modern lithotrity had been realized by the distinguished London surgeon, Sir Henry Thompson, who could count his cases by the hundred, and whose delicate touch with a lithotrite as modified

by himself was supposed to have conquered the dreaded mischances of the operation, if it were within the limits of skill and experience to do so. Despite his distinguished success, and although he had reduced the necessary manipulation within the bladder to an almost incredibly brief space of time, many of Sir Henry's colleagues, influenced by the too frequently calamitous results of lithotrity, and led by Sir James Paget, were about to return once more to the practice of lithotomy.

Stimulated by the decreasing confidence in lithotrity, Mr. Clover, a London surgeon, devised an apparatus, consisting of a catheter with a hollow india-rubber ball attached to act as an aspirator, intended to remove by suction the crushed stone remaining in the bladder after the use of the lithotrite. But the diameter of Mr. Clover's catheter (21, *filière* Charrière) did not allow the passage of even moderate-sized fragments, and his rubber ball was too weak for practical purposes, its expansive force not being sufficient to raise the catheter's own volume of water to a height equaling the length of the instrument. This tentative experiment, therefore, brought about no modification in lithotrity.<sup>1</sup>

It was under these circumstances, though without deliberate predetermination, that Dr. Bigelow began his study of the treatment of calculus by lithotrity. It had been the topic of some of his most painstaking lectures, and was always thoroughly illustrated upon the dead subject. The experience of the lecture-

<sup>1</sup> Boston Medical and Surgical Journal, October 16, 1879.

room, and his surgical familiarity with the operation, made its difficulties so very apparent that he became insensibly absorbed in the project for their elimination, or at least their diminution.

In the first place, Dr. Bigelow asked himself if erroneous convictions, mostly traditional, did not prevail in regard to certain points connected with lithotrity. This question he soon answered in the affirmative. Contingencies connected with urethral and bladder surgery also convinced him that the baneful sequelæ, believed to be due to the use of instruments within the bladder, really resulted from the presence and the sharpness of crushed fragments of the stone, and that this misconception not only led to excessive precautions in the introduction and manipulation of the lithotrite, but had induced Civiale to restrict the duration of its use to five minutes at any one sitting, and Sir Henry Thompson to two. In the interval between two sittings, angular fragments often provoked symptoms so serious as to compel a postponement of further interference; and, indeed, their pernicious presence and influence sometimes brought about a fatal result. These circumstances forced Dr. Bigelow to the further conclusion, that no worse danger could possibly be incurred from the protracted use of smooth, effective instruments, if the entire removal of the calculus were thereby accomplished in a single operation.

Finally, experimentation made it clear that a stone, after being crushed, might be removed through the urethra by means of proper tubes and suction apparatus, and that in the majority of cases, with the aid

of anæsthesia, the bladder could be completely evacuated at one long sitting. This idea was not in itself novel, nor did it originate with Mr. Clover. Sir Philip Crampton, of Dublin, in 1846, had already attempted immediate evacuation; and at a meeting of the Boston Society for Medical Improvement, Dr. Bigelow exhibited, in one of his earliest demonstrations of rapid lithotrity, an old rubber bottle attached to a catheter, — of unknown history, except that it came from South America, — which for many years had been preserved in the Warren Museum of the Harvard Medical School. It was painfully evident, however, that no evacuating machinery hitherto employed accomplished its purpose. The problem of “an evacuator which should evacuate” was ultimately solved by the adoption of large evacuating tubes (28–32, *filière* Charrière), and an elastic bulb of competent exhausting power.

It is impossible to convey an adequate idea of the labor expended by Dr. Bigelow in the elaboration of his new instruments, especially upon the shape, traps, couplings, strainers, outlets, and inlets of the rubber bulb. In perfecting a single important point, he would invent and discard contrivances by the score. His note-books were filled with drawings which his fertility in resources suggested. More than twenty distinct and original inventions are comprised in his complete apparatus for Rapid Lithotrity. His room was monopolized by rejected models of his “Simplified Evacuator,” which occupied all available horizontal surfaces, usurping seats of chairs, and even the



floor, — “kicking about,” as Dr. Holmes has said, “among the pamphlets, instruments, and all sorts of learned litter which was commonly to be found variegating the pattern of his carpet.” A curious thing in regard to these *disjecta membra* is, that every one appeared to work about as well as another, though in some way they all failed to suit Dr. Bigelow’s exacting requirements.

In performing lithotritry under the rule that two minutes should be the limit of time, Dr. Bigelow, like other surgeons, had been annoyed by the clogging of the blades of his lithotrite with the pulverized detritus of the stone which was being crushed. An instrument which should be non-impacting, and thereby faster working, became a matter of necessity. A more powerful lithotrite was also called for, so that larger stones might be attacked than had heretofore been considered advisable, and one which in addition should be better adapted for rapid comminution, the reduction of the stone to powder being no longer requisite.

In order properly to estimate the curves, shape, and general adaptation of the instrument he wished to construct, Dr. Bigelow made a large number of casts of the interior of the bladder, with a lithotrite *in situ*. This he accomplished by injecting plaster of Paris through the urethra, allowing it to harden, and thus imprison the instrument in various positions. Frozen sections were also made, and photographs taken for future reference. Aided by the hints thus obtained, he modified the blades, teeth, heels, locks, and finally the handle, of the lithotrite already in use. Minor

but useful modifications were also adopted, tending to the production of an instrument combining greater strength with the least practicable addition to its size and weight. As a result, Dr. Bigelow developed a lithotrite containing new principles, — a lithotrite which will never be set aside, though it may hereafter be improved, so that the operation, which is not easily accomplished, or lightly to be undertaken by surgeons inexperienced in lithotrity, can perhaps be intrusted to less educated hands.<sup>1</sup>

Dr. Bigelow also contrived an artificial bladder, with which he could practise experimentally. The choice of a substance to represent calculus occasioned him an immense amount of persevering trial with all sorts of materials, until he finally satisfied himself that either a peculiar quality of anthracite coal or fragments of old grindstone would best suit his purpose, their consistency being nearly the same as that of real calculus, and their color making them readily visible.

Three years were devoted by Dr. Bigelow to these studies, with an indefatigable industry which only witnesses can appreciate. Food, sleep, and time became matters of small consideration when the fervor of his task possessed him. He made no concealment of his experiments when he felt sure of having reached a point at which he could show something new and useful; but his thoroughness delayed the completion of his labors. Hence the new method of lithotrity was not proclaimed beyond the School and the Hospital walls

<sup>1</sup> Appendix II., p. 282.

until 1878. A familiar letter to a medical friend, prior to his first publication, well illustrates his exactitude and his liberality:—

“My method and my *brevet* are wholly at your service, but not for a report to any society. I do not want any one to publish or report them until I have done so myself in a local paper. I withhold for *perfectionnement*: (1) The long *séance*; (2) the self-discharging lithotrite; (3) the ejecting ditto; (4) the large tubes; (5) the distal aperture of ditto, to insure the strongest suction at the most depressed point (dependent on the discovery of the little suction at a quarter-inch from the end), whether the aperture be straight, or oblique, or a little curved, and also whether the extremity of the tube be straight or curved,—in short, the science of suction, and the art of accomplishing it while preventing its stoppage (a) by the valvular action of the bladder, or (b) by fragments impacted in the tube, or (c) by fragments engaged in the orifice of the tube; also, (6) the elastic tubing; and (7) the long tube in the trap.

“Before I started this, *séances* were (unless exceptionally) short and many; and their object dust, and not fragments, — which was evacuated by Clover, — which is as good as nothing.”

Mr. Reginald Harrison (then of Liverpool) having just returned from Boston, where he had seen Dr. Bigelow operate, exhibited the new instruments for the first time in England before the British Medical Association, August 8, 1878. In the course of the address which he then made, Mr. Harrison, corroborating the above estimate of Clover's evacuator, says:—

“Clover's apparatus, from the small size of the catheter and the character of the syringe attached, was not competent

to do more than remove such particles of stone as would escape naturally during the act of micturition.”<sup>1</sup>

That the dangers of lithotrity were due to sharp fragments of crushed stone and decomposable débris left within the bladder, and not to the use of instruments, was a genuine and most important discovery. By it, without taking into account the great fatality attending lithotomy in cases formerly considered unfit for the crushing operation, the rate of mortality pertaining to the old lithotrity has been reduced more than fifty per cent. The distinguished English surgeon and lithotritist, Mr. W. F. Teevan, says:—

“The principles on which it [the new lithotrity] is founded are as widely opposed to those upon which the ordinary lithotrity was established as are the two poles to each other. The old method was sometimes spread over a period of months; the new one is the work of a certain number of minutes, and in this respect resembles lithotomy, the advocates of which used to urge that one of its great advantages was, that, unlike lithotrity, it rid the patient at once of his trouble.

“Even if we had possessed Bigelow’s perfect instruments, we should not have dared to perform his operation, if he had not shown us the great amount of instrumental interference the bladder will tolerate, if we only take care to remove all the fragments at once. This is the grand point, and to Bigelow solely belongs the great merit of the discovery.”

The lithotrite of Dr. Bigelow was not an inseparable part of his method. The ovoid handle calculated to fit the hand, the locking of the screw by a turn of the wrist, the peculiar construction of the blades to prevent

<sup>1</sup> British Medical Journal, vol. ii., 1878, p. 280.



impaction, were great improvements ; as was also the power of the instrument, enabling the operator to crush the hardest as well as the largest stones. No lithotrite, however, without the concomitant evacuation, would have rescued from inevitable neglect the traditional and primitive operation formerly in vogue. Dr. E. L. Keyes, of New York, is explicit on this point. He says : —

“It is therefore wide of the mark to imagine that Dr. Bigelow’s operation is a modification of any old procedure. The operation is a totally new conception, a new design which disclosed itself to its discoverer, a design which may be executed equally well with different instruments from those with which it was first performed. Its success does not depend upon the instrument, but upon the method ; the method is the operation. Professor Bigelow naturally prefers his own instruments for its execution, but they are not essential. With or without an anæsthetic any lithotrite may be used, any evacuating catheter, any washing bottle, and the operation remains the same, providing the aim of the operator is to relieve the bladder entirely of débris by aspiration, without taking into account the time consumed.”

Civiale’s operation of lithotrity, in use without any special modifications from 1824 to 1878, was a singular instance of surgical conservatism. Two years after the latter date the removal of stone at one sitting had entirely superseded Civiale’s method, and was practised in all civilized countries. The London “Lancet,” in a judicial editorial of January 28, 1882, says : —

“Four years ago the origin of the operation of lithotrity, its leading principles, the best modes of performing it, the fittest instruments, and other conditions relating to it, were

supposed to be the commonplaces of surgical literature. The year 1878, however, saw a sudden and violent change. A direct blow was struck at every one of the rules that had been laid down by experts for the safe conduct of operations of lithotrity."

At first supposed to be applicable only to adults, the use of rapid lithotrity within the last ten years has been successfully extended to children two years old and upwards; whereas children were never considered fit subjects for old-fashioned lithotrity. This innovation, adopted first in India, has lately been introduced into England and America. Dr. Bigelow's invention may therefore justly be declared to have acquired world-wide renown.

Dr. Bigelow's operation has been variously designated as Rapid Lithotrity with Evacuation, Lithotrity at a single Sitting, Lithotrity with Evacuation at a single Sitting, and Litholapaxy; the last name being derived from λίθος, a stone, and λάπαξις, evacuation. The name Lithokenosis was suggested by Professor Sophocles, the verb κενόω applying to the *vessel emptied* and to the *things emptied*.<sup>1</sup> It is perhaps oftenest known simply as Bigelow's Operation for Stone.

The publication of "Rapid Lithotrity with Evacuation," (which first appeared in "The American Journal of the Medical Sciences," Philadelphia, January, 1878,) did not fail to create a professional sensation. The revolution was so complete, that at first a feeling of horror was engendered in many minds at the seemingly rash

<sup>1</sup> Appendix III., p. 286.

proposals of the American surgeon, whose precepts were pronounced by some to be as unsound as his practice was rude and dangerous. The "British Medical Journal," for August 3, 1878, page 171, says:—

"Dr. Bigelow's name is so well known in this country that anything from his pen demands attention. Still, it is probable that if any surgeon here had brought forward such an innovation, based upon fourteen recent cases, his proposal would have been surely condemned, or treated with indifference.

"We do not think that Dr. Bigelow's line of practice will meet with any followers in this country, and it is to be regretted that he has lent his name to a proceeding that is likely to bring discredit upon the operation of lithotomy,—an operation which still has so many open opponents that it more than ever requires to be saved from its friends."

Sir Henry Thompson, if he did not absolutely appropriate the discovery of Rapid Lithotomy as his own, certainly encouraged the idea that it possessed no features which were new to him. In the editorial of the "Lancet," already quoted from, the writer adverts to this assumption as follows:—

"The new procedure, having superseded its precursor, has at length entered the second stage of existence. No longer to be ignored, or slightly passed by, it must needs be shown that the measure is not really new, and that, indeed, it only gives formal expression to what was floating on the surface of every thoughtful mind. In a lecture recently published in our columns, Sir Henry Thompson, *facile princeps*, the lithotomist of Europe, assured his hearers that Sir P. Crampton, Baron Heurteloup, Mr. Clover, and Sir Henry himself, had, one or other, for forty years been steadily travelling in the same direction as Dr. Bigelow, in his endeavors to perfect the operation of lithotomy by complete crushing of the cal-

eulus and meehanial withdrawal of the fragments at one sitting.

“It is easy enough, by the kind of wisdom which follows events, to find that the idea of rapid lithotrity did not originate with Dr. Bigelow, however great his originality may otherwise have been in devising the best mode of giving it effect. Sir Henry Thompson, so far as he was describing the history of the operation, was justified in gathering together these scattered and scanty pieces of evidence. He might have gone even farther than he did, and shown that Velpeau advocated the completion of the operation at one sitting, though he would in fairness have had to add that these attempts were always condemned by Civiale in uncompromising terms.

“So great was Civiale’s dread of instrumentation that he disapproved of the administration of an anæsthetic, lest in the absence of resistance on the part of the patient the surgeon might be tempted to prolong the sitting. With this dread of instrumentation Civiale inoculated all his disciples. Sir Benjamin Brodie insisted that long crushings were only permissible in the dead subject; while Sir Henry Thompson, still more impressed with the danger of instrumentation, inculcated by precept and practice the utmost brevity in the actual crushing, and even abandoned as hurtful Civiale’s practice of using preliminary injection and subsequent washings of the bladder in order to get rid of the detritus.

“The school of Civiale, with its dread of instrumentation, is already extinct; but the school of Velpeau and of Bigelow, with its dread only of peccant fragments, is in the ascendant.”

Other and less distinguished surgeons than Sir Henry Thompson also disparaged — not to say assailed — Dr. Bigelow’s pretensions to originality; and in one or two instances it was claimed that he had not given due credit to contributory investigations. These reclamations had reference, not to principles, but to details;



most of them non-essentials. The principles were never attacked.

Dr. Bigelow's strong sense of justice caused him to answer all criticisms — in both English and American medical journals — with dignity, courtesy, and directness; and these rejoinders influenced public opinion. To-day no one dissents from the conclusion that he maintained his claims to everything which he considered original with himself and essential to his method; and that he in no way slighted or ignored the researches of other surgeons, such as Crampton, Clover, Otis, Van Buren, Keyes, Browne, etc.

The only persistent antagonism encountered by the new method came from Sir Henry Thompson; but as he adopted every important point into his own practice, Dr. Bigelow felt little disposition to complain. Although by no means silently submissive, he was willing to let him convince himself that London was not the birthplace of the new operation. In the "Lancet" of January 17, 1880, two years after the introduction of Dr. Bigelow's method, Sir Henry Thompson says of rapid lithotrity : —

"This was a bold, but I believe it was a happy idea. My mind was already prepared by past experience to receive it favorably, although the means employed in the shape of instruments, especially the lithotrites Dr. Bigelow proposed to use for the purpose, it was impossible for me to approve; and I at once tried the plan, and have to a very great extent carried it out during the past twelve months. I am bound to say that as far as I can judge, — as far as now thirty-one cases thus managed enable me to judge, — I think the principle a decided step of progress for lithotrity."

This commixture of constrained approval and condemnation was followed, in the subsequent paragraphs of Sir Henry's paper, by criticisms on the paraphernalia of rapid lithotrity, rather than by a discussion of the main points of the new operation. In his fifth edition of "Clinical Lectures on Diseases of the Urinary Organs," Lectures 12, 13, and 14 are devoted to Lithotrity. Here Sir Henry adopts all the vital principles of Dr. Bigelow's method; but, with scanty reference to their originator, he leaves the reader to infer that they are the outcome of his own experience and reflection.

Not until 1883, five years after their promulgation in America, did Sir Henry Thompson unqualifiedly admit that the process of "crushing stone at one sitting, and removing all the fragments by the aspirator, has proved the most successful operation ever practised in dealing with very large and hard formations." Alluding to his own experience of one hundred and one cases of Litholapaxy, with only three deaths, the mean age of the patients being sixty-two and a half years, Sir Henry adds: "This is a result which, I venture to say, has hitherto been unequalled in the history of lithotrity."<sup>1</sup>

French appreciation of rapid lithotrity was shown in the award to Dr. Bigelow in 1883, by the National Academy of Medicine, of the larger part of the Argeuteuil Prize of ten thousand francs given once in every six years in recognition of the most important improvement made during that period in the treatment

<sup>1</sup> Diseases of the Prostate, London, 1883, p. 153.

of diseases of the urinary passages. Apparently begrudging the concession of the whole sum to any other country than its own, the Academy awarded six thousand francs to Dr. Bigelow, while the remaining four thousand were bestowed upon M. Théophile Anger, for the authorship of a *brochure* entitled "New Instruments for Operation with the Thermo-Cautery in Penoscrotal Hypospadias."

In 1881 the Triennial Congress of the International Association of Physicians and Surgeons was to be held in London. Rapid Lithotripsy had already been taken up by European surgeons, and those particularly identified with the treatment of calculus manifested so great an interest in Dr. Bigelow's innovation that his presence at the Congress became an obvious necessity. The provisional officers therefore sent him a personal invitation to take part in its proceedings, and to open a discussion in the Surgical Section, on "Recent Advances in the Methods of Extracting Stone from the Bladder of the Male."

Dr. Bigelow's disinclination to take any part in such meetings, whether at home or elsewhere, led him courteously to decline the compliment. The invitation was nevertheless renewed, and was again declined. It was repeated still a third time, and then, feeling that his non-compliance with so urgent a request could no longer be persisted in without the assignment of some false motive, he finally consented to accept.

That this reluctant visit was, however, a source of great satisfaction to Dr. Bigelow cannot be doubted.

He cared little for expressions of approbation. The outward or visible signs of fame were to him of small account. He did not seek applause on this or other occasions when he had been serviceable to his fellow men; but the warmth of his reception in London by medical men of eminence from all parts of Europe, and the flattering circumstances attending his demonstration of Litholapaxy at the Congress with the aid of the artificial bladder, — riveting the attention and exciting the admiration of the entire audience, — were indeed an ovation to this triumph of American surgery, of which the recipient, as well as his countrymen present, had reason to be proud. Fifteen minutes were allowed to those who opened a discussion, and ten minutes to subsequent speakers; but an extension of Dr. Bigelow's time was unanimously demanded, and thus he had an opportunity — nearly an hour being given him — for such a complete presentation of his subject as would have been impossible under the usually inexorable rules of the Congress.

In a private letter to Dr. Bigelow, the President of the Surgical Section of the Congress, John Eric Erichsen, Esq., F.R.S., had already said, "Your operation is the first real advance in the treatment of stone since Civiale perfected his system of lithotrity"; but in his Inaugural Address, before Dr. Bigelow had made his demonstration, he declared: —

"It is undoubted that a complete revolution has been effected by the enterprise and skill of one of our American brethren, for it cannot be questioned that Bigelow's operation has completely changed the aspect of lithotrity, and there is



every reason to believe that it constitutes one of those real advances in a method which marks an epoch, not only in the history of the operation itself, but in the treatment of the disease to which it is applicable."

Though ordinarily regarding social functions as inflections, the private attentions bestowed upon Dr. Bigelow in London were so cordial, that no one with his disposition could be otherwise than pleased, and even touched. Perhaps no compliment gratified him more than being one of the three or four foreign delegates privately selected to become members of that exclusive medical association, the Clinical Society of London.

The impressions left upon his mind by this great International Congress cannot perhaps be better disclosed than in the words of an after-dinner speech which he made in London, and in which he said: —

"There is one thing in which all the gentlemen here, — whatever be their nationality, or however different may be their views of the various problems of human life, — one thing in which they all unite, and that is, a deep interest in the advancement of medical science. It is a sure sign of progress in any calling when the votaries of it come from different parts of the civilized world to a meeting like this. Within the memory of many here present it would have been in every way impossible.

"We undoubtedly have all, sometimes, asked ourselves what the great men of the past would have thought of our ways; what Columbus would have said of a line of ocean steamships, or what Franklin would have thought of a phonograph, or Ambroise Paré of a Lister dressing. It is well sometimes to look forward and ask what the medical men of a hundred years hence will probably think of the medical attainments of our generation. Not that it will make a difference to anybody present here to-night. Only, if the

inevitable progress of the next century is going to place our descendants as far in advance of us as we believe ourselves to be in advance of our forefathers, the self-congratulations of the present occasion might be chilled by a premature vision of what the future has in store for our children. But in any case there would be something we could pride ourselves on, — which our descendants, however much they may think of themselves, will have to thank us for, — and that is, that we have been studying facts, and not theories. In these days the statement of a medical theory is only an appeal to those best able to judge, to examine and re-examine a series of facts, and see whether they support it.

“I am impressed to-night with the number of well-known scientific men brought together at a meeting distinctly medical, and with the diversity of their learning, which is not confined to what were once strictly medical limits, but ranges over all the physical sciences. Every year sees a greater number of such philosophers, and shows more clearly how, when we talk of medical practice, we are dealing with the results of their investigations into a multitude of subjects, some purely medical and some only indirectly related to the art of healing, but each of them, if successfully and thoroughly investigated, a separate study, enough to occupy one man's attention profitably. The medical student of these days depends more and more for the quality of his acquisitions upon the teachers of special medical subjects, and requires, every year, more time to go beyond the range of subjects that have an immediate medical value. In America, what we especially have to contend with is the desire of young men to get at work in their profession. What we urgently need there is the presence of those great masters in special science who now attract so many of our students to the Universities of the Old World. I see here many gentlemen to whom our young men look back with the warmest gratitude for the profitable hours spent in their laboratories. The influence of such men is leaving its mark upon the lives of their American pupils, and through them upon medical science in America.

“One result of all this is that the type of the medical man has changed. Many a famous practitioner of former days was a dangerous theorist, and probably damaged somebody every day. But he did the best he knew. He inherited his theories, and judged his facts by them. Let us not pride ourselves that we are not as he was, for we do not yet know what shortcomings the next generation will discover in us. Our type of the medical man, however, will not be altered by any future criticism: he is a man of sound sense and disinterested integrity in practice, of many broad and accurate facts, of cultivation to judge of those facts,—and there is nothing in this to prevent his being an agreeable man also. There are many such, but I hope I may be allowed to add that we can have no better example of such a practitioner than that of the distinguished gentleman who occupies the chair this evening.”

Soon after his return to Boston, Dr. Bigelow was invited to New York, to demonstrate the operation of Rapid Lithotrity before a special meeting of the New York Academy of Medicine. Again he reluctantly assented, as a duty to his professional brethren in a city quick to adopt his operation, and also out of regard to Dr. B. Fordyce Barker, then President of the Academy, to whom he was indebted for most friendly attentions while they were together in London. In the interval between the publication of his paper on Litholapaxy and the final triumph of his claims, Dr. Bigelow had encountered much vigorous opposition. It was not strange, therefore, that he should be less unwilling than usual to receive an authoritative acknowledgment, in his own country, of the utility and success of the radical improvement which he had wrought in the surgical treatment of one of the most formidable diseases known to mankind.

The congratulations of his New York brethren and their generous attentions were a fitting finale of the public honors bestowed upon researches which monopolized the thoughtful labor of several of the most active years of Dr. Bigelow's life.

At the Harvard Commencement dinner, in 1882, when Dr. Bigelow received the honorary degree of LL. D., — having already been made Emeritus Professor of Surgery, — Mr. Henry Lee, President of the Alumni Association, had intended to introduce him to the assembled graduates of the University in the following words: —

“ Old Dr. James Jackson, long the Nestor of his profession in Massachusetts, speaking of one of his pupils, (Dr. Jacob Bigelow,) then risen to eminence as a physician, botanist, and technologist, described him as one who would find a grain of wheat in a bushel of chaff.

“ While we do not here inherit titles from our fathers, we do inherit talents, and the son of this remarkable father has risen to great eminence as a surgeon and a professor, as might have been safely predicted by any of his schoolboy and college comrades, whatever profession he had selected. This eminence has been recognized by his Alma Mater this day.

“ Yet there is reason to fear that our Emeritus Professor of Surgery has, by his two great operations upon the stone and upon the hip joint, incurred the anathema of our great Shakespeare, who thus imprecates such meddlers:

‘ Blest be the man who spares these stones,  
And cursed be he that moves my bones.’ ”

As Dr. Bigelow was not present at this dinner, these words were not spoken, but they formed part of Mr. Lee's address at the Memorial Meeting of the Boston



Society for Medical Improvement, held after Dr. Bigelow's death.

It was with great unwillingness that Dr. Bigelow ever appeared in court as an expert witness; but whenever he did, his clearness of statement and his surgical acumen, not less than his candor and self-possession, invariably left their impression upon court, counsel, and all others present.

The Malden murder, perpetrated December 15, 1863, created great public interest. Frank E. Converse, assistant cashier and son of the president of the Malden Bank, was left in charge of the bank, with five thousand dollars for the exigencies of business, while the cashier went to Boston for a couple of hours. Just after midday the young man was found in a bleeding and unconscious condition on the floor of the banking-room, in the most open and public building of the place, in the very centre of the populous town of Malden.

Citizens who had entered the bank only a few minutes before the catastrophe saw Converse seated at his desk, reading a newspaper. Though surviving his injuries nearly an hour, he did not recover consciousness. Two wounds were found, one in the left side of the forehead, the other behind the right ear. Two physicians gave conflicting testimony as to these injuries, only agreeing that they were bullet wounds. One thought they were made by a single bullet, entering from the rear; the other, that they were made by two bullets, the first entering in front and coming

out behind, the second entering behind and coming out in front, following, in a reverse course, the track of the first. Opinions also differed in regard to the existence of powder discoloration of the skin, and the singeing of the hair.

The disappearance of the money left in charge of Converse confirmed the belief that this was no case of suicide; and the coroner's jury, having decided that a murder had been committed, without further examination gave an order for the burial of the body, — "as if seeking to hide rather than to explore."<sup>1</sup>

A month elapsed, and the crime was still a mystery. Two or three arrests were made, one of a respected citizen, who was not, however, long held in custody. As the murder occurred at the customary dinner hour, few people were in the streets. A stranger, evidently a drover, was nevertheless seen passing through the town, and some peculiarity in his appearance attracted the attention of several individuals. In the dearth of other evidence, here was a possible clew to the murderer. A detective traced this drover, as he believed, to a town in Maine, gained his confidence, and proposed a joint speculation in Brighton cattle. On their way to Brighton the detective made an excuse for stopping at Malden. Without being aware of it, the drover was there scrutinized by those who thought they could recognize him; but they all agreed that he was not the man whom they had seen. The detective then got rid of his companion by picking a quarrel with

<sup>1</sup> Boston Herald, December 16, 1863. Boston Medical and Surgical Journal, January 21, 1864.

him ; and the unsuspecting countryman returned home, ignorant as to the secret of his fruitless journey.

The directors of the bank, nonplussed by the lack of evidence, finally applied to Dr. Bigelow for further examination of the wounds in the dead man's head.

Having ascertained that Converse had been found behind the glass partition which separated the public from the bank officers, lying on his back and looking upward, with his feet by his desk and his head toward the centre of the room, Dr. Bigelow next determined the fact that there were crisped and burned hairs about the wound in the forehead, and also that the wound behind the ear was peppered with powder over a space of one and a half inches in diameter. Post-mortem changes prevented any decision as to powder stains on the forehead.

Careful investigation revealed two distinct wounds, each with a separate bullet for its separate track through the brain. One bullet, entering the left side of the forehead near the hair, had passed directly backward. The other, entering behind the ear, had passed slantingly upward, and then glanced obliquely downward, perforating the base of the skull. The two wounds of entrance could not be united by a straight rod traversing both. The recovered bullets, now more or less flattened, had probably been conical, and of .22 calibre, each weighing about twenty-seven grains.

Two questions presented themselves. First: Did Converse, standing at his desk, receive these wounds from a pistol pointed over the glass partition? Experi-

ment proved that, at the distance involved in this supposition, bullets from a .22 calibre seven-chambered Smith and Wesson pistol, would not rebound inside the skull, even if they possibly penetrated its bony wall; nor could the hair have been singed and the skin powder-blackened at such a distance.

Second: Did Converse, while standing at his desk, receive a shot from behind at very close range, the bullet entering behind his ear? and, when he fell on his back, was a second ball shot into his forehead? The penetrating force of the bullets, the powder stains behind the ear, and the burned hairs on the forehead, sustained this supposition.

This second theory Dr. Bigelow offered to the directors as commending itself to his judgment; but it inevitably indicated that the murderer was some familiar person, of whom Converse would take little notice, — a visitor accustomed to go behind the railing into the place where the money and books were kept.

There were few such visitors; but one of them was Edward F. Green, the postmaster, and he was arrested that night, February 7, 1864, seven weeks after the murder. Other evidence closing around him, he confessed his crimes. Knowing that Converse was alone, Green went into the bank twice during that forenoon, intent on the murder, but was interrupted. The third time he succeeded, using just such a revolver, and in precisely such a manner, as Dr. Bigelow thought and suggested. The murderer had embezzled town funds intrusted to him for the purchase of school-books, and was further pressed for money by the approaching



confinement of his young wife; and this was the road by which he hoped to escape from debt.

Green pleaded guilty when his case came up for trial. No witnesses were examined, and he was sentenced to death. John A. Andrew, then Governor, being opposed to capital punishment, the death-warrant was not signed until his successor, Governor A. H. Bullock, came into office; and the execution took place April 13, 1866, more than twenty-seven months after the offence.

This murder occurred while coroner's inquests still prevailed. Although Dr. Bigelow never made his connection with this event public, the facts show the contrast between intelligent medico-legal observation and that which is superficial, perfunctory, and irresponsible. In great measure, the circumstances narrated occasioned the agitation which eventually led to the abolishment of the office of coroner, and to the enactment of the present law, by which a trained physician conducts the medico-legal examination of any violent or sudden death, and becomes the government adviser in the judicial inquiries which may follow.<sup>1</sup>

In 1849, the Medical School building on North Grove Street was the scene of an extraordinary murder. Dr. George Parkman, a well-known citizen, who had recently given to Harvard University the land on which this building stood, was last seen alive when entering it at a quarter before two o'clock on the afternoon of Friday, November 23. On the Monday and Tues-

<sup>1</sup> Boston Medical and Surgical Journal, January 21, 1864, p. 503.

day ensuing the building was fruitlessly searched by the police. No lectures were delivered after Tuesday, the regular vacation of Thanksgiving week beginning on that day.

In consequence of suspicions which had been conceived in his mind, Ephraim Littlefield, janitor of the building, determined to obtain access to a certain vault under the sole control of, and beneath that part of the building occupied by, Dr. John W. Webster, the Professor of Chemistry. It was the only place which had not been examined, and there were no means of direct approach to it save through the chemical laboratory, where, although it was vacation, Dr. Webster was known to be spending the greater part of each day alone, behind locked doors, presumably engaged in studious occupations.

On Thursday, Thanksgiving Day, Littlefield announced to Dr. Bigelow his intention of cutting a hole through a brick wall in the basement, in order to reach this vault. Dr. Bigelow told him to "go ahead." The janitor did not complete his undertaking until near the close of the next day, being unable to pursue his work except when Professor Webster was absent from his laboratory; but it ended in a discovery which sent a thrill of horror through the whole community. In the vault, by the light of a flickering candle, he saw parts of a human body. These, together with other parts, some found in an old tea chest, and some half calcined in Webster's assay furnace, were subsequently proved, not only to belong to one and the same individual, but to conform with certain peculiari-

ties of, and to restore without duplication, the missing portions of Dr. Parkman's body.

While dining at half-past four o'clock on this Friday afternoon, Dr. Bigelow was notified that a man wished to see him in his office. There he found Littlefield, who tremblingly cried, "Oh, I have found him! I have found him!" Dr. Bigelow caught Littlefield by the collar, — suspicion having been directed toward the janitor, — and said, "Damn you! what did you have to do with it, Littlefield?" "Nothing! Nothing!" was the answer.

Dr. Bigelow at once sent for Mr. Francis Tukey, the City Marshal and Superintendent of Police, and together they went with Littlefield to Mr. Robert G. Shaw, Dr. Parkman's brother in law. Mr. Shaw accompanied the three to the Medical College, where they crawled under the floor to a spot whence, by the aid of a light, they could look through the hole in the wall and see the remains. They next went to the house of District Attorney Samuel Dunn Parker, and after long deliberation, officers were sent to arrest Professor Webster in Cambridge, where he lived, and place him in Leverett Street jail.

After his arrival at the jail that night, Dr. Webster was taken to the Medical College, and confronted with the mutilated body, so that if possible he might explain this seemingly fatal discovery. Preferring not to meet Professor Webster, Dr. Bigelow secured the attendance of Dr. Martin Gay, a chemist, and one of Dr. Webster's friends, as a substitute for himself at this critical interview. In Dr. Gay's account, on the

following morning, of his visit to the jail and to the College, he says:—

“Dr. Webster’s condition was the most remarkable I ever saw. He was lying in his bunk, arched on his head and heels. We stood him up. The tumbler of water we gave him rattled against his teeth, and he was unable to swallow. At the college he did not seem to have the use of his legs, and was entirely supported by the officers. He appeared very much agitated, and sweat ran down his cheeks.”

This was afterwards explained. When Dr. Webster was led into the jail office, he stood by the stove, took something out of his waistcoat pocket, and placed it in his mouth. It was undoubtedly strychnine; though why it failed to kill him, no one knew.

The week previous to Dr. Webster’s arrest was one of great public agitation. Even the safety of the college building was threatened, for it was surrounded by an excited and ignorant crowd of men and women, only too ready to believe that a crime like those of Burke and Hare had been committed.

As a colleague, Dr. Bigelow was reluctant to accept any evidence against Professor Webster; but a few days before the arrest, out of mere curiosity, he went into the office of a foundry close by the college, and was surprised at the tension of feeling among the employees. “Why was that furnace burning all last Friday night?” asked one. “I want to know why that dog followed Dr. Parkman up the steps the day of Dr. Webster’s lecture, and lay there till four in the afternoon?” said another. To Dr. Bigelow, who was familiar with dogs, this incident was an impressive



one ; but obviously such evidence could not be used at the trial, — a trial which has become memorable in the annals of jurisprudence for its dramatic incidents and medico-legal testimony. Dr. Webster was convicted ; and he confessed the crime before his execution, which took place on August 30, 1850.

At the time of this trial, Dr. Bigelow, who would have been an important witness, was dangerously ill from a dissecting wound, — the result of an insignificant prick on the back of his hand by a scissor point, — which culminated in a severe palmar abscess. The scars of the incisions requisite for relief, and the contractions which followed, remained permanent evidence of the intensity and extent of the suppuration, though they in no degree interfered with the flexibility of his fingers, or the use of his hand.

The aptitude which led Dr. Bigelow into the investigation of complex and difficult problems also induced him to take particular interest in phenomenal cases, — encountered by all surgeons of large experience ; and the “Crowbar Case,” long alluded to in books of surgery as one of the most remarkable injuries ever recovered from, attracted his attention perhaps more than any other single surgical accident ever brought under his observation.

Phineas P. Gage, an intelligent and vigorous man, twenty-five years old, was blasting rocks. Having adjusted a charge of powder, his assistant was to cover it with sand. In a few seconds, his own attention being diverted from the work, Gage dropped the head

of the tamping-iron — a bar in general resemblance like a crowbar — upon the charge, in order to consolidate or tamp it in. His assistant had failed to pour in the sand, the iron struck fire from the rock, the uncovered powder was ignited, and an explosion took place.

The iron bar was driven upward, and passed through Gage's head, entering at the angle of the lower jaw, and breaking out through the top of his skull, Dr. Holmes says, "as if it had been pie-crust." Shooting high into the air, the tamping-iron fell some yards away, where it was picked up, smeared with brains and blood. He was thrown upon his back, and gave a few convulsive motions of the extremities, but spoke after a minute or two. His men took him in their arms, carried him to the road, only a few rods distant, and placed him in an ox-cart, in which, sitting erect, he rode full three quarters of a mile, to the hotel where he boarded. He got out of the cart by himself and sat down in a chair upon the piazza, where he was found by the physician who first saw him, half an hour after the injury. He was perfectly able to answer inquiries about the accident, and with little or no assistance walked upstairs to his room, where his wounds were examined and dressed.

This event took place on the line of the Rutland and Burlington Railroad, near Cavendish, Vermont, September 13, 1848. The iron which crashed through the bones of the face and skull, and traversed Gage's brain, weighed thirteen and a quarter pounds. It was three feet seven inches in length, and one inch and a

quarter in diameter. The entering end was pointed, the taper being seven inches long, and the diameter of the point a quarter of an inch.

On November 15, two months after the accident, Gage was out and about, and his restoration to health was apparently accompanied by but one disability, the loss of sight in his left eye. Dr. John M. Harlow, now of Woburn, Massachusetts, but then of Vermont, under whose intelligent care the recovery took place, reported the details of this marvellous case in the "Boston Medical and Surgical Journal" for November 13, 1848.

An injury so great with a loss of function so inconsiderable seemed incredible. It was believed by some that the mechanism of the injury must have been misunderstood. With the assistance of Dr. Harlow, Dr. Bigelow therefore secured the patient's presence in Boston, and kept him for a number of weeks under his own supervision, satisfying himself that the bar did in fact traverse Gage's head, and that he had essentially recovered from the injury. By the aid of an anatomical skull, in which he carved and drilled a track representing that followed by the projectile, and large enough to permit the passage of the actual tamping-iron, he demonstrated how the bar found its way through the cranium without inflicting fatal lesions, although cutting off one of the optic nerves in its course.

In the "American Journal of the Medical Sciences" for January, 1850, Dr. Bigelow published an account of his observations, with the reasons for his conviction of the correctness of the evidence and the exactitude

of the history of this occurrence, illustrating the description by several lithographs. He says:—

“ This is the sort of accident which happens in the pantomime at the theatre, but not elsewhere. Yet there is every reason for supposing it in this case literally true. Being at first wholly sceptical, I have been personally convinced; and this has been the experience of many medical gentlemen who, having first heard of the circumstances, have had a subsequent opportunity to examine the evidence.”

By his later history it appears that Gage, hitherto a well balanced and shrewd business man, grew erratic and volatile, fond of telling stories with no foundation outside of his own fancy. In fact as his acquaintances said, he was “ no longer Gage.” He took to travelling, and exhibited himself under Barnum, with the tamping-iron for his constant companion. Finally he accepted employment with a man who was going to Chili, to establish a line of stages in Valparaiso, and remained there from 1852 until 1860, nearly eight years, taking care of horses, and often driving a six-horse coach, heavily laden. In 1859 his health began to fail, and he had an illness the nature of which is unknown. In 1860 he went to San Francisco, and in February of the next year, after a day's ploughing, he had a series of convulsions. Three months later another attack occurred, after which he became comatose, and died May 21, 1861, twelve years, six months, and eight days from the date of his injury. There was no autopsy.

In July, 1866, Dr. Harlow, after corresponding with Gage's mother, obtained permission to have his



cranium sent to Boston for examination and preservation. This *pièce justificative* was exhibited to the Massachusetts Medical Society at their annual meeting, June 3, 1868. At the same time a final statement of the case was made by Dr. Harlow, the particulars of which may be found in the publications of the Massachusetts Medical Society, Volume II., page 329. Gage's skull, together with the iron bar, was also presented by Dr. Harlow to the Museum of the Harvard Medical School, where they now are, together with the illustrative skull prepared by Dr. Bigelow, and the cast of his head taken when Gage was alive and under Dr. Bigelow's observation.

By one of those *coups dramatiques* which were now and then incidents of his surgical communications, Dr. Bigelow at this same meeting of the State Society, and without giving notice that he intended to do so, exhibited a man, a French Canadian, about twenty-seven years old, through whose head had been driven a piece of iron gas-pipe, four feet two inches long and five eighths of an inch in diameter. Entering over the right eyebrow, it emerged behind and below the left ear. The pipe projected about equally from the front and the back of the head, and much force was required for its withdrawal by a fellow laborer. The soft felt hat which the man wore was transfixed and pinned upon his head by the pipe. The accident happened in the State of Ohio, May 14, 1867, and was occasioned by the unexpected explosion of a blasting charge in a coal mine. The recovery of the patient was so rapid that at the end of ten weeks he was walking about.

Having heard of this remarkable injury, Dr. Bigelow made arrangements for the subject of it to visit Boston. Dr. Jewett, the physician who had been in charge of the case, transferred the patient to Dr. Bigelow's care, and also presented him with the gas-pipe. Remaining under observation for several weeks, the man appeared in perfect physical condition, and, as far as could be judged, his intellectual functions were not disturbed. When addressed, his expression was singularly pleasant and intelligent; and he evidently apprehended what was said to him, though seldom replying in words. His infrequent response was, *Mais, oui!* and this phrase, with the word *tabac*, of which article he was very fond, seemed to constitute his whole vocabulary. His condition was evidently one of aphasia. Dr. Bigelow heard nothing of his *protégé* after the summer of 1869; but he was then in fine health, and his power of speech had decidedly improved.

A cast of this man's head exhibiting the scars of his wounds, his hat with its two holes, and the iron gas-pipe, were presented by Dr. Bigelow to the Museum of the Harvard Medical School, where, together with the memorabilia of the Crowbar Case, they constitute a unique collection.

In 1861, at the outbreak of the War of the Rebellion, Dr. Bigelow delivered, by invitation, a gratuitous course of lectures, chiefly on operative surgery, for the benefit of medical men whose services seemed likely to be demanded by the emergencies of the time.

Although but one indication of the then pervading enthusiasm, this episode deserves particular mention as an illustration of his thoroughness in all serious undertakings.

These lectures were accompanied by an exceptional wealth of demonstration. The peculiarities of wounds from different kinds of bullets and muskets, and the operations belonging to military surgery, were illustrated upon dead subjects, and discussed in the effective way which always made his teaching noticeable. In May, 1861, the Boston Medical and Surgical Journal, commenting on these lectures, remarks: —

“When we state that the request to deliver these lectures was made to Dr. Bigelow on Saturday, that the first was delivered on the following Monday, and followed up with hardly a day’s intermission to the close, — each lecture being from an hour and a half to two hours long, with demonstrations on the dead body, — some idea may be got of the amount of work done.

“The audience which daily crowded the lecture-room might well inspire any man to his best efforts. Two hundred or more eager listeners, members of so busy a profession as ours, could not be drawn day after day to the college by any ordinary attraction. The lectures were eminently practical, and the interest in them was sustained to the end.

“The course comprised a complete *résumé* of all the topics embraced by the copious subject treated of; from ligation of all the principal arteries, every form of amputation, fractures, dislocations, gun-shot and other wounds, to the diseases peculiar to armies, the important hygienic precautions for protecting the health of soldiers, the peculiar duties of surgeons in the field, the professional status of the military surgeon and his relations to other departments of the service.

“The subject of wounds was made peculiarly interesting by experiments performed in the presence of the audience. Having been furnished by the Adjutant General with the various kinds of arms likely to be used, Dr. Bigelow inflicted bloodless and painless wounds on the dead body before the class. An opportunity was thus given, for example, of witnessing the fearful effects of the Minié ball upon the bones, crushing and completely disorganizing the large joints, where a common musket ball made a simple direct perforation.

“The whole course of lectures was, of necessity, much condensed, and the labor of preparing them was proportionately the more arduous; this could be done, however, without the danger of important omissions, as the audience was one of practising physicians, not students.”

Shortly after the battle of Fair Oaks, fought May 31, 1862, Dr. Bigelow was sent on a private mission by the Hon. E. M. Stanton, Secretary of War, to observe and report upon the state of the medical department of General McClellan's army, then in front of Richmond.

On June 4, some forty-five hundred sick and wounded soldiers, many of them from the above-named battle-field, had been sent to White House Landing, on the Pamunkey River, where they found neither supplies, surgeons, nor hospital stewards, no one authorized to take charge, and only supply boats for their accommodation. These, together with the hundreds who arrived daily during the ensuing week, were compelled to throw themselves upon the abounding charity of the Sanitary Commission for beds, food, stimulants,—in fact, for nearly all the necessities of life.



This state of things occasioned severe newspaper comment, and Dr. Bigelow was asked to look into it, and, if possible, to explain its cause. He was aided by the volunteer efforts of Mr. Frederick Law Olmsted, at that time chief executive officer of the Sanitary Commission, and he wrote his report to Secretary Stanton at the headquarters of that Commission ; but the nature of the report is unknown.

The preparations for a change of base from the Chickahominy to the James River, just previous to the Seven Days' Battle, began while Dr. Bigelow was at General McClellan's headquarters, and obliged him to fall back to White House, which he reached barely in time to take passage on the last boat, when that position was abandoned, the rebels being already at Tunstall's, three miles distant. Locomotives, cars, and piles of supplies as large as houses were burned, lest they should fall into Confederate hands, and the dense smoke of burning bacon clouded the air. Corrals of invalid horses and mules were turned loose to shift for themselves, and the Signal Corps were waving their flags from the only building intact. Before the first bend in the river was reached, the boom of cannon intimated that the gunboats were already firing upon the enemy.

Dr. Bigelow arrived at Harrison's Landing in season to hear the thunder of the battle of Malvern Hill, on June 30, and to see a green and smiling plain transformed in twenty-four hours to a white and sandy desert, by the trampling of an arriving army, after a whole week of desperate fighting.

The opportunity for the further prosecution of the duty intrusted to Dr. Bigelow — as to the details of which he was always reticent — being terminated by the existing military situation, he returned home by way of Washington. The authorities, however, had been warned. Profiting by this warning, they sent to the James River the well qualified Medical Director, Dr. Joseph Letterman, whose influence was already being felt when Dr. Bigelow left Harrison's Landing.

The work of the Sanitary Commission, and the efficiency of the women in charge of the hospitals on the river steamers, were greatly commended by Dr. Bigelow. He was impressed by the hardship and discomfort endured by these ladies, especially their need of better food. While in Washington he represented the case to the Reverend Dr. Henry W. Bellows, President of the Sanitary Commission; and in a letter to one of the ladies he had met, who was also an old friend, he jocularly wrote: "I told him that in all probability no one on board that boat [the 'Wilson Small'] would live to get home, but that a few puddings, if administered immediately, might save one or two; and I gave him six excellent receipts." This lady had mended his trousers while he was at the front, and he always declared that but for her his mission would have had no dignity.<sup>1</sup>

Immediately after his arrival at home, Dr. Bigelow was prostrated by Chickahominy fever, a typho-mala-

<sup>1</sup> "The Other Side of War," by Katharine Prescott Wormley, Boston, 1889.

rial affection prevalent in the Army of the Peninsula, by which he was practically disabled for a year.

In July, 1863, when the United States military draft went into effect in Massachusetts, Dr. Bigelow's name was among those drawn. Having reached the age of forty-five years in the preceding March, he was of course exempt from service. Not choosing, however, to avail himself of this narrow margin of release, he furnished a substitute.

The address of welcome delivered by Dr. Bigelow as Chairman of the Committee of Arrangements, when the American Medical Association met in Boston, in 1865, at the close of the war, — its meetings having been interrupted for four years, — might almost be included among his patriotic services. Some of its spirited sentences deserve repetition. After alluding to the circumstances under which the Association assembled, he said:—

“No one can doubt that the medical science of this country, now ostensibly represented in this body, is destined one day to occupy a very high place in the medical history of the world. The American mind, the practical ability of which no one has ever doubted, is devoting itself more and more to the study, by exact experimental observation, of abstract truth, each year augmenting the number of medical philosophers devoted to scientific research at the sacrifice of professional and personal interest. . . .

“While the great Republic is accomplishing its political destiny, let us not fail to carry forward our corresponding mission of relieving human suffering, averting human disaster, and retarding human decay; not by deceptive assumptions, not by fallacious assurances, not by the dogmas which professional pride has set up, but by an earnest, impartial, and

discriminating pursuit of truth, and by an unwearied effort to divorce popular error from the companionship of legitimate science. . . .

“ We rejoice to offer an earnest expression of our gratitude to those of our medical brethren who have stood so nobly at their posts by sea and land amid the carnage and pestilence; and who, surrounded by the distractions of the camp and of the fight, have borne a conspicuous part, both by their active services and their literary labors, in upholding the honor and dignity of their profession. . . .

“ I welcome you, friends and brothers, assembled from distant regions of our common land, — from the great commercial emporium through whose aortic thoroughfare pours the ceaseless tide of nations, or from the city whose traditional brotherly love echoes so freshly from the lips of all our wounded soldiers; . . . and you, — few we may fear, but thrice welcome, — loyal and faithful brothers of the South, who have passed through the long night of trial that you might hail to-day the glorious dawn of liberty. . . . Welcome all who honor us by their presence on this auspicious morning, which beholds the sacred emblem of liberty restored to its rightful places, tattered with bullets, stained with blood, fringed with the sable sign of mourning, but spread over every stronghold from which treason had struck it down, and soon to rekindle all its ancient glories.”

Throughout Dr. Bigelow's connection with the Medical School, he was a power in its administration. Everything which concerned its welfare engaged his earnest attention, and invariably aroused his intellectual energy, and forthwith carried him, with all his practical ability, into the minutiae of executive details.

Almost from the moment he entered the Faculty, in 1849, he took his place as foremost in its counsels, and the rapid growth of the School from 1858 to 1870



owed as much to his sagacity as to his surgical pre-eminence. Conservative by nature, he regarded sudden and extreme changes, in whatever direction, as sure to do more harm than good. He was therefore a "strenuous and indefatigable opponent of the new projects" which, in the winter of 1870-71, were the subject of prolonged discussion, and led to important changes in the general plan of the Harvard Medical School. It is conceded, however, that "the caution and moderation which his opposition induced the majority of the Medical Faculty to practise made the measures they finally recommended all the wiser, and therefore the surer to succeed."

Previous to 1871 the Medical Faculty was independent as to its policy, its finances, and practically as to its official appointments. The changes introduced in that year relieved it of these responsibilities, which were thereafter assumed by the Corporation of the University. An entrance examination was instituted; and in place of the system already briefly referred to (page 13) a graded course was established, requiring three full years of study, with a satisfactory examination at the end of each of these years as a prerequisite to entering upon that which followed, and for presenting one's self for the final examination for a degree.

This radical innovation was initiated by the newly elected President of the University, who, unheralded, and for the first time in its history, took his legal place as presiding officer at the meetings of the Medical Faculty, a position occupied only nominally by his predecessors. In the twinkling of an eye it was

obvious that, *de par le Roi*, there was a new administration.

At an early meeting, when the coming revolution in medical education cast its shadows before, one who was present relates that Dr. Bigelow asked for an explanation why so many changes were proposed, when everything was prosperous and quiet. For a moment there was a dead silence. Then President Eliot replied, with that peculiarly firm softness which belongs to some of his utterances: "I can tell Dr. Bigelow the reason; we have a new President."

The glove of contention thus thrown down was willingly picked up by the questioner, and there ensued a frequent succession of Faculty meetings, often lasting until after midnight, in which medical education was exhaustively discussed. In these discussions, which rose sometimes to the heat of a battle-field, Dr. Bigelow was a most active leader, his keen persistency as a debater never being more conspicuous. His efforts to bring the President and those who followed the President to his own way of looking upon the questions at issue were determined and unrelenting, and occasionally humorous.

At one point of this prolonged debate, President Eliot declared continued argument useless, as the Corporation of the University had made up its mind to carry out the proposed scheme. "The Corporation?" exclaimed Dr. Bigelow. "Does the Corporation hold opinions on medical education? Who are the Corporation? Does Mr. — know anything about medical education? Or Rev. Dr. —? Or Judge —?"

Why, Mr. —— carries a horse-chestnut in his pocket to keep off rheumatism! Is the new medical education to be best directed by a man who carries horse-chestnuts in his pocket to cure rheumatism?"

At a later period, when Professors' salaries were under discussion, and their adjustment by the number of each one's lecture hours had been suggested by the Corporation, Dr. Bigelow sent that dignified body the message, that, "if he understood their plan, it was to pay a Professor in proportion to the time it takes him to tell what he knows." On another occasion, when it was proposed to reserve a percentage of salaries as the basis of a pension fund, he said this seemed to him "a scheme of the Corporation to cut down the pay of the already underpaid and overworked Professors, in order to have something wherewith to salve their own consciences when they came to turn them off."

In the Annual Discourse delivered by Dr. Bigelow before the Massachusetts Medical Society in 1871, immediately after the new scheme went into operation, he re-embodied the opinions which he had urged before the Faculty in opposing the sweeping changes they had adopted, in a forcible essay on Medical Education in America. A few detached extracts from this readable production may convey some idea of Dr. Bigelow's attitude as the minority leader in a now historic clash of arms.

The main point of Dr. Bigelow's contention was, that the proposed changes in the machinery of the Medical School, as well as in the principles of medical

instruction, laid too much stress upon lines of collateral and less applicable knowledge, which students would not need when in practice, and would actually forget.

“Whatever else it may or may not do, a medical school should aim first to give a plain, sound, solid education, without error if without ornament. . . . It should guarantee to the student of average preliminary training and acquirement, who had honestly devoted three years to medical study, a knowledge at once adequate to the immediate practice of his profession, and a germ of future growth in the right direction, — knowledge unmistakably medical, practical, comprehensive, and rooted in the soil of modern science. . . .

“Is the average medical student to be educated as a pioneer, an explorer on the outskirts of medical science? I answer, that he is to cure disease, and until he can do this with all the collected actual and accepted knowledge and wisdom of his day and generation, he cannot spend his time profitably in experiments and explorations. The teacher has no more right to invest the time of his student in studying the geography of a dozen pleasant paths in the domain of science, because one of them may some day lead to pathology or therapeutics, than a guardian has to invest the money of his ward in stocks or securities of uncertain or only possible prospective value to him. . . .

“Two classes of the profession claim our consideration, — those who are to do the daily work of medical attendance only, and those who may be expected to contribute something to medical knowledge, — for each of whom a course of education is to be provided, such as will not rise above the proper requirements of the one, nor fall below the just expectations of the other; or we may rather, with more economy, aim to devise a single system, suited to the education of a body of students as routine practitioners and something more, . . . recognizing, as a fact always to be kept in mind, that the period of the medical student’s curriculum especially, attended



with varying and permanent results, begins with his graduation, when he is set free and left mainly to himself.

"In giving this utterance to what a medical friend of mine was once pleased to denounce as scientific blasphemy, — in assigning a limit to the present utility of certain branches of science in medical education, — I do not propose a barrier to the progress of human knowledge, but insist that less applicable science should not be confounded with medical art, — what the student may or may not need, with what he must have. . . . Art is the scientific application of the more accurate and positive part of human knowledge. It is this which the student of medical science needs, call it by what name you will.

"No medical school in this country, however disinterested its professors, can afford, on any ground, to lose sight of the size of its classes, which are at once the soil and its fertilizer. . . . It has been speciously maintained to be absolutely better to turn out a few graduates educated to a certain standard, than a larger number not educated quite so well. The aim of any reform in medical education should be to educate at least an equal number of students to a higher standard; and the standard in this country may be raised in the future, as in the past, gradually and with certainty, by making the best opportunities available to the largest number.

"He who, impressed with their obvious advantages, attempts to incorporate the German into the accepted American system, will find that this luxuriant growth of another hemisphere is not wholly adapted to our soil or to our requirements. He must supplant public opinion by a central government, supreme in all matters pertaining to education and hospital administration, replace the American with the German professor, and the American student with the German student. . . .

"Medical teaching should not be too much interfered with, nor its machinery hampered, by those who are not familiar with its working. A university, apart from its medical teachers, can know little or nothing of the complicated lines

of division between medical subjects, or of their relative importance, upon which depends the establishment of professorships and other offices. . . . It may well hesitate to assume more than a general supervision over machinery which has a complicated relation to the medical community, and especially to the rest of medical teaching throughout the country, of which but a small part is connected with universities,—machinery which, to insure success, must be largely an anomaly in its relations, its rules, and its offices, when compared with other departments of a university.”

Admitting the fact, made manifest by the vote of the Faculty, that his opinion was that of a minority, Dr. Bigelow finally says:—

“The new measures have been adopted by the Professors in the spirit of personal sacrifice, with a full sense of the possibilities they may entail of increased labor and diminished pecuniary receipts, and of which I feel it incumbent on me here to say, that whatever credit attaches to them is due to my colleagues and to the President of the University.”

This admirable discourse presents a comprehensive and graphic exposition of medical education from Dr. Bigelow's conservative point of view, derived from his experience, and enforced by a critical analysis of the use and value of each department of medical science, and of the methods of instruction prevailing in German schools. In reading these telling and sometimes lively pages on “Medical Education in America,” it is not to be forgotten that they were written nearly a quarter of a century ago; and that, in spite of his ineffectual protest, Dr. Bigelow continued to labor in the Harvard Medical School with unabated devotion for ten more years. At the time, however, the subject was upper-

HENRY J. BIGELOW,

FROM A PHOTOGRAPH TAKEN ABOUT 1872.









most in his mind ; and it is conceded that his apprehensions have in a degree been justified. In his memorial article on Dr. Bigelow, Professor R. H. Fitz says : —

“ Although the plan adopted by his colleagues resulted in a diminution of the number of students, the finances of the School were rather improved. . . . This diminution in the number of students, and the increased cost of educating them, are perhaps causes of an increased influx of medical graduates of other institutions, whose standard is less high, into the towns of Massachusetts and other parts of New England.

“ Dr. Bigelow’s objections to the teaching of a disproportionate amount of less applicable knowledge are now being advocated by some of those who were his most vigorous opponents. They complain that enough, perhaps too much, has been done for the development of laboratory teaching in the scientific branches of medical study, and too little to foster and promote increased facilities for clinical instruction.”<sup>1</sup>

The admission of women to the Harvard Medical School was in 1882 the subject of another long and intense contest. The proposal was advocated by President Eliot as strongly as it was opposed by a large majority of the Faculty.

The Faculty made no objection to the medical education of women *per se*, but protested decidedly against their admission to the Harvard Medical School. It had successfully endeavored to raise the standard of medical education higher than anywhere else in America. The School was doing all it could, all that the community asked ; and it was believed that co-education, even if combined with certain exclusive instruction to women, would involve an expense, as well as a de-

<sup>1</sup> Boston Medical and Surgical Journal, November 27, 1890.

rangement of its new machinery, which the School could not yet sustain, and which would eventually prove disastrous.

The vehemence of this controversy was enhanced by the fact that the President personally conveyed to the governing boards of the University the conclusions of the Faculty. In discharging this duty he communicated only their votes, omitting to give the reasons upon which they were based; and these, not being in harmony with his own views, he neutralized by his antagonistic arguments in the discussions to which the votes gave rise.

As Dr. Bigelow declared, "Even if right and justice were on the side of the Faculty, it appeared that the President must be there also." It was stated by President Eliot, in the course of the controversy, that the opinions of the Medical Faculty were treated lightly by the Corporation and the Overseers, because the Faculty had a "vacillating mind," inasmuch as they had now reached an opposite conclusion to that recorded in their vote of 1878, — when the discussion in reality began, — by which they agreed "to receive women as students, provided \$200,000 were raised to meet the necessary expense." In citing this record, the President separated its two clauses, and regarded the first as an unqualified expression of the Faculty's opinion; the second, in reference to money, touching, as he said, a matter on which the Government of the University was alone competent to advise.

In order, therefore, to get the question fairly before the Board of Overseers, a conference was arranged be-



tween a committee of that body and a committee of the Medical Faculty. In their subsequent report, the committee of the Overseers made no comments and offered no recommendations to the Board, but simply presented the opinions of the Faculty as to the inexpediency of permitting women to enter the Medical School, and submitted certain resolutions passed by the Faculty at recent meetings. An active debate on this report resulted in the passage of a vote, "That in the opinion of the Board of Overseers it is not advisable for the University to give any assurance, or hold out any encouragement, that it will undertake the medical education of women in the Medical School of Harvard College."

This result was due almost wholly to Dr. Bigelow's untiring zeal. He never paused in his activity. He would not be put down. He allowed no advantage to escape him. His quick-wittedness — as well as the plain and forcible language in which he made his meaning unequivocally clear to every listener, and exposed the motives of every antagonistic suggestion — was the very soul of this discussion, which extended beyond the limits of the Faculty room. There was a certain amount of suppressed feeling due to causes not germane to the question, but, as far as the immediate interests of the Medical School were concerned, its position was definitively settled by the action of the Overseers.

In 1882 Dr. Bigelow resigned his Professorship. The event was regarded as of grave interest to the

Medical School and the whole University. In his Annual Report of that year President Eliot chronicles this occurrence, and speaks of Dr. Bigelow as "a discoverer and inventor of world-wide reputation, a brilliant surgical operator, a clear and forcible lecturer, a keen debater, and a natural leader of men, by force of activity, ingenuity, and originality." He further adds: "In recognition of his eminent services to the University and the public, Dr. Bigelow was chosen, in May last, Emeritus Professor of Surgery, and the degree of Doctor of Laws was conferred upon him at the last Commencement."<sup>1</sup>

In an editorial, inspired by Dr. Bigelow's resignation, the "Boston Medical and Surgical Journal" for June 15, 1882, says : —

"Deeply versed in an unusually wide range of subjects, of marked technical skill, with a singular ability for seizing the vital point of a subject, few men have possessed in an equal degree the power of making themselves distinctly understood, and of giving their hearers something definite to carry with them from the lecture-room. Perhaps it would be descriptive of his peculiar faculty to say, that his lectures were particularly fitted to the essentially practical character of his American pupils. His students seldom meet in consultation over a surgical case without quoting some remark of their old master.

"In the government of the School it is certainly no disparagement to the gentlemen of the Faculty to say, that the loss of his voice at the council board will be a most serious one."

In parting with their colleague of thirty-three years, the Medical Faculty entered upon their records the following minute : —

<sup>1</sup> Appendix IV., p. 247.

*Resolved*, That we recognize the great loss which this Faculty has sustained in the retirement from the Chair of Surgery of Professor Henry J. Bigelow, whose keen observation, accurate research, and rare genius in devising new and improved methods of operative procedure have done so much to render this School conspicuous, and to make American surgery illustrious throughout the world."

With this resignation Dr. Bigelow ceased to be a medical teacher.<sup>1</sup> The moment seemed opportune for a significant recognition of his great services, not only to the profession, but to the public. Accordingly his former house surgeons in the Massachusetts General Hospital, together with some of his most intimate friends and attached patients, requested him to allow a marble bust of himself to be made by Launt Thompson, as a gift to Harvard University, with the condition that it should permanently adorn the surgical lecture-room of the Medical School.

On October 17, 1888, the celebration of the hundredth anniversary of the Medical School was to be combined with the dedication of a new building devoted to its use; and as this was a specially appropriate occasion, the bust was presented to the University, Dr. Samuel A. Green, a former Mayor of Boston, addressing the President as follows:—

"The pleasant duty has been assigned to me, Mr. President, to present to you, as the head of the Corporation of Harvard College, in behalf of his many friends, this animated bust of Professor Henry J. Bigelow. The list of donors comprises about fifty names, and includes nearly all the surgeons of the two great hospitals in this city, several gentlemen

<sup>1</sup> Appendix V., p. 290.

not belonging to the medical profession, but warm personal friends of Dr. Bigelow, a few ladies who had been his patients, and all the surgical house pupils who had ever been connected with the Massachusetts General Hospital during his long term of service at that institution, so far as they could easily be reached by personal application. The bust is given on the condition that it shall be placed permanently in the new surgical lecture-room, which corresponds to the scene of Dr. Bigelow's long labors in the old building. It has been made by the eminent sculptor, Launt Thompson, of New York, and is a most faithful representation of the distinguished surgeon. It outlines with such accuracy and precision the features of his face and the pose of his head that nothing is wanted, in the opinion of his friends, to make it a correct likeness.

"I need not, in the presence of this audience, name the various steps by which Dr. Bigelow has reached the high position which is conceded to him as freely and fully in Europe as it is in America, but I cannot forbear an allusion to some of his original researches. His mechanism of the reduction of a dislocated femur by manipulation was a great discovery in surgical science, and follows as a simple corollary to the anatomical facts which he has so clearly and minutely demonstrated. His operation of rapid lithotomy has deprived a painful disease of much of its terror, as well as of its danger. Nor should I overlook on this occasion his quick and ready discernment of the importance of Dr. Morton's demonstration of the use of ether as a safe anæsthetic, which took place at the Massachusetts General Hospital in the autumn of 1846. The discovery of this greatest boon to the human family since the invention of printing was fraught with such immense possibilities that the world was slow to realize its magnitude; but by the clear foresight and prudent zeal of Dr. Bigelow, shown in many ways, the day was hastened when its use became well-nigh universal.

"Dr. Bigelow has filled the Chair of Surgery in the Harvard Medical School during thirty-three years, a period of



professional instruction that rarely falls to the lot of any teacher; and he now leaves it with the honored title of Professor Emeritus. During this long term of service he has taught, through his lectures, probably not fewer than 1,800 students who have graduated at the School, and perhaps 7,500 more who have taken their degrees elsewhere; and by these thousands of physicians now scattered throughout the land, those of them who survive, Dr. Bigelow is remembered as most eminently a practical teacher. Active in his profession, clear in his instruction, and enthusiastic in his investigations, he always had the happy faculty of imparting to his students a kindred spirit and zeal. *Haud inexpertus loquor.*"

At a still later period, when Dr. Bigelow's connection with the Hospital had ceased, and his retirement from professional life was complete, he was made the recipient of the following letter:—

March 12, 1889.

DEAR SIR,—Not only in our own name, but equally in that of one hundred and ninety-three members of the Boston Medical Library Association, we desire to express to you the satisfaction it would give us to have your portrait in the room of the Library.

We ourselves wish, and those who come after us will wish, to see the portrait of the eminent Boston surgeon to whom such permanent improvement is due hanging on the walls of the Medical Library Association, which is the common centre of medical science and art in our community.

G. C. SHATTUCK.	H. P. BOWDITCH.
H. DERBY.	H. C. ERNST.
E. H. BRADFORD.	H. I. BOWDITCH.
O. W. HOLMES.	ABNER POST.
C. F. FOLSOM.	F. S. WATSON.

Acceding to this cordial invitation, Dr. Bigelow sat for his picture by Vinton, who has represented him at

three-quarters length, in the attitude of lecturing. A blackboard, on which is a chalk drawing of the Y ligament, forms the background; a table with lithotripsy instruments stands at one side.

This picture was given to the Medical Library by Dr. Bigelow himself, but with the proviso that it should not pass into the hands of the Association until a projected fire-proof building was erected, in which it might be safely placed.

The production of these two works of art afforded him congenial occupation, and his interest in them has already been alluded to. The results were personally satisfactory. Whatever criticism bust or picture may elicit from those most familiar with his features and bearing, it has never been denied that they worthily embody, and with artistic dignity, the great surgeon whose memory and image are thus transmitted to posterity.

The busy life which Dr. Bigelow led was apparent to every one. He could do nothing important without putting his whole heart into it; and often would so exhaust himself by concentrated attention and physical expenditure that he was fain to lie down, and by preference on the floor, where he would fall asleep in an instant. At other times he would rest himself by changing the scene and strolling through the most bustling streets of the city; for he was always a believer in the theory that the best rest, next to sleep, is to be had from a change in occupation. He was altogether too practical not to realize the importance of

recreation. So constituted that, metaphorically speaking, he could shut the "drawers of his mind" at a moment's notice, he never allowed the evidence of fatigue to go too far, but would, almost literally, take flight to New York, to Lake St. Clair, to Currituck, to the Nubble, or to some other accessible shooting-ground, and remain — nobody knew where or for what length of time — until he was reinvigorated. He often said that the only thing which had enabled him to make a somewhat slender capital of health last him through life was "dropping everything and clearing out" when fatigue warned him that he was overworking.

Dr. Bigelow's capacity for amusing himself was as pronounced as any other trait of character. He would go to the theatre night after night when there was good music or acting, or an attractive ballet. In the latter part of the evening he enjoyed the club, with its chatty gossip and news of the day. He was not a great talker, but he was companionable and humorous, and had a lively disposition, which made people like to listen to him. At one period he was a frequent diner out; but in later years he took little or no part in society. Even medical meetings, in which in early life he had taken a constant active interest, he rarely attended, unless he had some special thing to say or show.

Dr. Bigelow was seldom unoccupied or idle. The most trivial matters were apt to suggest some inquiry to his inquisitive mind, which personal experiment alone would satisfy. Before he was fully aware of it, he would be deep in the mysteries of a serious or curi-

ous investigation. A toy kaleidoscope once set him at work upon a larger one, with a section of stove-pipe for its cylinder, and an ingenious arrangement of revolving cells at the end, each independent of the other, to hold articles of varying specific gravity, whereby the transmutation of colors and geometrical forms became gradual and visible. He modified a stereoscope, with a dissolving view arrangement, so elaborate as to require the Lowell Machine Shop to build it. He was an expert photographer, untiring in the enigmatic perplexities of that art. His subjects of interest were surprising by their number, as well as their variety. He had a way of taking things up and letting them drop; but he never abandoned them until he ascertained their limitations, — eviscerated them, or drained them dry, as he would have expressed it. His colleague, Dr. Oliver Wendell Holmes, says that he always pictured Dr. Bigelow in his mind's eye as "standing knee-deep in squeezed lemon skins." His pleasure, however, lay in pursuit rather than in attainment. It was the way in which a thing was done, and the principle involved, not the fact of having done it, which attracted him. As he often said, "I like to get a thing to the point where anybody can do it; but after that there is no fun in it." He felt, with Shakespeare, that

"Things won are done ; joy's soul lies in the doing."

Dr. Bigelow would catch up and follow out all sorts of flitting impressions. A man drums well in a passing band. At once he buys the best drum to be had, and an instruction book, and does not rest until he



can equal the tambours of a French regiment, and rattle out their familiar rolls and rataplans. Having reached this point, he characteristically drops the accomplishment altogether. Even the absurdities of Punch and Judy were a fascination, until he acquired the knack of a skilled exhibitor. Juggling was a more enduring recreation, — an art he early learned in Paris; and he never lost interest in the higher exhibitions of legerdemain, such, for instance, as those of the older and younger Herrmann, or of Commendatore Cazeneuve, who was the first to show the trunk trick in Boston.

At one time Dr. Bigelow amused himself with the study of ants; and placed the sand for their galleries and nurseries in shallow boxes, with glass plates at top and bottom, so that the work of the colony and the care of their young could be observed. He went patiently into the study of agates, and theorized as to their formation. He possessed a superb collection of them, — now in the cabinets of the Museum at Cambridge, — and in search of new varieties had ransacked the dealers' garrets in Oberstein and Idar, the centres of the agate trade of the world. He converted the attic of his house in Chauncy Place into a pigeon loft, where he raised the choicest of fancy breeds. His wonderful Pouters, Fantails, and Almond Tumblers had taken the gold medal at every show in England, and came from the dove-cotes of a retired London brewer, Mr. Hicking, and a wealthy bullion broker, Mr. James Bult, — amateur breeders who limited themselves to a few pairs, and never sold their superfluous stock, even

thirty guineas being refused for a single pair. Proud that the fame of their pigeons had reached Boston, and that they should be appreciated by its distinguished surgeon, these gentlemen sent them to Dr. Bigelow, without money and without price, insisting only that a special attendant should accompany them from London to their destination. A Cunard state-room was reserved for their safe transportation. Dr. W. C. B. Fifield, of Boston, an admiring pupil just then passing his examination at the Royal College of Surgeons of England, took great interest in securing this gift for Dr. Bigelow.

So large and valuable was Dr. Bigelow's flock, that a "pigeon-woman" became a necessary adjunct to his household; but when he had acquired the best attainable collection, and secured, by careful selection and elimination, a "flight" which satisfied him by their compact, lofty, and sustained flying, and had learned how his Pouters swelled their breasts, he abandoned pigeon raising for "green fields and pastures new."

A superb talking Myna bird was long an ornament and a curiosity in Dr. Bigelow's consulting-room. He added to its conversational powers, taught it to pronounce his own name with most uncanny variations of inflexion, and to whistle airs. "What's your name?" was its startling exclamation to waiting patients. On one occasion, when the bird thus shouted from the inner room, a lady replied, "You had better come and see, if you want to know!" A tame little troupial played vivaciously about the room, and would hide in

his sleeve. Hanging from their boxes, and clinging to each other, like the clustered blossoms of a Wistaria, a cageful of forty or more Japanese "sociable" or "crowding sparrows" invited attention.

Dr. Bigelow kept a collection of monkeys, so large that he had to hire special quarters for them. Such was his sympathy with the sensitive timidity of his little friends that he disliked taking visitors into their presence, and when he did always enjoined upon them to assume a smiling face, rather than the peering scowl of curiosity. When the collection outgrew its tenement, as it finally did, and it became impracticable to take care of them any longer, the monkeys were all humanely put to death, lest, if otherwise disposed of, they should fall into bad hands among organ-grinders or showmen. His gentleness to dumb animals was akin to his tenderness with children. His faculty for taming them and attaching them to himself was extraordinary. He had great respect for their intelligence, their confidence in man, and their affection, which he was always quick to recognize, — a recognition they seemed promptly to understand and appreciate. He cared comparatively little for creatures in whom these attributes were lacking.

In his business days, Dr. Bigelow always drove a single horse. His vehicles were never exactly like those of other persons, and the differences were always alterations for the better. A buggy designed by him won for its builder a first gold medal at a local industrial exhibition. He was fond of large horses, and was extremely hard to suit; for he deemed impera-

tive a combination of fine limbs, handiness, style, size, and intelligence which was difficult to obtain. For many years he held in high esteem a noble bay, named Charley. This horse had belonged to a lady, and was sold by her as a dangerous runaway. Being a personal friend, she wrote to Dr. Bigelow declining the delivery of an animal so unsafe. He insisted, and she remonstrated; but finally he had his own way, and at once made friends with the horse, whose broad forehead and intelligent eye were an assurance that, properly treated, he would be perfectly manageable. Mutual good-fellowship was quickly established. The conduct of Charley was irreproachable; he never did a wrong thing while serving his new owner, and his proud carriage seemed to indicate an appreciation of the position he held in his master's regard. When he became unfit for service, he was chloroformed; and among Dr. Bigelow's last directions was this: "Never sell any of my horses. Kill them, if too old for use."

If Dr. Bigelow's pleasure in the contentment and happiness of animals was great, his sympathy for them in a state of fear or of suffering may be described as even intense, and his indignation at their brutal treatment knew no bounds. He once got into trouble in Paris by his denunciation of an abusive omnibus driver, who was mercilessly and needlessly stinging, with the blows of a cruelly devised lash, a superb high-strung and willing Percheron. He battled manfully with several men, in a Southern city, in order to wrest from their torturing hands, and put out of misery, a wounded turkey



buzzard, with which they were heartlessly playing; and yet, as one of these men said, "This is the most sick'nin' bird as flies."

This sentiment grew upon Dr. Bigelow, and found expression in his forcible denunciation of vivisection. He became impatient when that subject was alluded to. In his address on Medical Education, he protested against the cold-blooded cruelties practised in the name of science: —

"Better that I or my friend should die, than protract existence through accumulated years of torture upon animals whose exquisite suffering we cannot fail to infer, even though they may have neither voice nor feature to express it. . . . The instincts of our common humanity indignantly remonstrate against the testing of clumsy or unimportant hypotheses by prodigal experimentation, or making the torture of animals an exhibition to enlarge a medical school, or for the entertainment of students, not one in fifty of whom can turn it to profitable account. The limit of such physiological experiment, in its utmost latitude, should be to establish truth in the hands of a skilful experimenter, with the greatest economy of suffering, and not to demonstrate it to ignorant classes and encourage them to repeat it."

Dr. Bigelow was not, however, the extremist which this language might seem to imply. It was to painful vivisection, and its misapplication, that he was opposed. He was ready to acknowledge that there is much in its processes which is wholly unobjectionable and also useful. An expeditious death and the slow baking of one of Claude Bernard's rabbits were not identical enormities in his mind; and he was almost as indignant when subcutaneous injections practised on

animals were called vivisection, or when antiseptic surgery was claimed to be "a gift of vivisectionists to the human race," as at the abuse of vivisection in illustrating truths already known, its preliminary dissections performed in the presence of classes, its repetitions by students, or its admission to the lecture-room. He believed that injustice to one animal was not lessened by the fact that any number of other animals, whether human or not, were to be benefited by that injustice; and if vivisection was to be advocated by science, that animals themselves should find a defender within the scientific pale.

Dr. Bigelow was aware that in this attitude he stood nearly alone in the medical profession, and he also knew that discussion could not be advantageously maintained with persons unacquainted with the requirements of scientific investigation, even when the interlocutors were on his own side of the question. Consequently he took little active part in the prevailing controversy. He thought, talked, and wrote about vivisection, but published almost nothing.

The extraordinary, the eccentric, and above all the surprising, had a peculiar fascination for Dr. Bigelow. These were the elements which made jugglery attractive, and they were also the secret of his fondness for the amusing, ingenious, but never malicious, practical jokes which he occasionally perpetrated on some intimate friend. The sole possession of a novelty, especially one which was unique, gave him great pleasure, for he was a born collector.

In Dr. Bigelow's boyhood, his father, together with the Hon. John Davis and Mr. Francis C. Gray, were active in obtaining evidence in regard to the sea serpent, which about that time, as well as previously, was said to have appeared in Massachusetts Bay. Among the incidents of those much discussed visits was the capture by some haymakers of a snake, about three feet long, in a salt marsh or on a beach adjacent to Gloucester Harbor, where the sea serpent had been seen, the remarkable feature of which was its humps,—a series of vertical undulations, like those described as characteristic of the so called sea serpent. This snake was subsequently exhibited as the *Scoliophis Atlanticus*. Its head having been injured in killing, a formidably crested artificial substitute, made of cork and quills, and, as Dr. Bigelow states, "of a nature to create a healthy interest in a popular exhibition," was devised by the showman, and the incredulous were invited to inspect a young but genuine specimen of the sea serpent.

Thirty years afterward, in a New Haven museum, it gave Dr. Bigelow great satisfaction to find and purchase this very snake, of which he had often heard his father speak. It proved to be an adult specimen of a common species. On dissection he found that the deformity was in the spinous processes of the vertebræ, which were sloped alternately forward and back, apparently as the result of rachitis. The coincidence of a humped snake on Gloucester Beach, suggesting alliance with the contemporaneous humped sea serpent in the Bay, ceased to be singular when Dr. Bigelow secured,

upon an island near Nantucket, a common green snake similarly distorted. Both these curiosities he gave to Professor Baird of the Smithsonian Institute.

It was characteristic of Dr. Bigelow that he should obtain possession of the first Edison phonograph shown in Boston. He took the greatest delight in charging it, in his best elocution, with the verses of "Old Ironsides," beginning, "Ay, tear her tattered ensign down!" and then letting them off in presence of Dr. Holmes, whom he brought into his house to hear a phonograph for the first time. The incident made a great impression upon the author of those spirited verses, whose sobered countenance resumed its habitual smile when "Little Miss Muffet, she sat on a tuffet," was piped out from the marvellous instrument.

Psychology, Evolution, Buddhism, Mesmerism, Finance, and the intricacies of Union Pacific Railroad accounts, each had its passing share of Dr. Bigelow's attention, not in a superficially casual way, but as the result of his thirst after less accessible knowledge, beyond most men's capacity. Occasionally this sort of study arose from the satisfaction to be derived from the accomplishment of an intellectual *tour de force*.

Dr. Bigelow was the owner of choice *bric-à-brac* and many curiosities, but he required the acme of perfection, or the nearest possible approach to it, and cared little for an article not of exceptional merit. His faience and majolica, his bronzes and lacquer, the pictures on his walls, reached a high standard of excellence. He was extremely fond of music. The love of it came



to him naturally, for his father also loved it, and another member of the family was a cultivated musician. He would often pause in the middle of a conversation, in making a medical visit, to listen to a well played piano in another room. His enjoyment of the Symphony Concerts was unflagging, and for many years he occupied the same seat in Music Hall. Though not a musician himself, he knew something of music theoretically, and carried in his head the melodies he liked. Even street musicians had to repeat their tunes if they struck his fancy. His quick ear once caught a new air, played upon a hand organ, which pleased him. As the Italian who ground it out could not speak a word of English, it was only with difficulty that Dr. Bigelow learned from him the name of the tune, and wrote it down accordingly, "*Silva tredi mon digo.*" He forthwith asked for it at the counters of the music publishers, Oliver Ditson and Company; but they had never heard of such an Italian song. Sure that it must be on their shelves or in their catalogues, he would not take no for an answer, and his eagerness enlisted half a dozen clerks in the search; when suddenly one of them burst into laughter, and exclaimed: "Look here! You're after 'Silver Threads among the Gold.'"

Dr. Bigelow's most abiding and enthusiastic delight, however, came from pictures. His taste was decided, and found its highest enjoyment in the works of the old masters. Conventional and popular art did not attract him. He was a student of composition and of drawing, and critical about proportions, perspective,

the mixing of colors, and as to methods of effect. His interest was in the technicality, rather than in the subject of a painting. Here it was that he derived so much pleasure from Vinton's portrait. He watched and criticised its gradual development so keenly that perhaps he felt almost as if he had been the painter, or at least that it embodied his own formula for such a work. Although partially color blind, bright color seemed to influence him in his choice of pictures. Dr. Holmes says: "A bright patch on an old canvas attracted him in a moment. He would wet his finger, and rub off the dust as eagerly as a gold hunter explores a pebble with shining yellow particles scattered through it." It certainly added to his enjoyment of ownership in a fine Hondekoeter, for example, which hung in his dining-room; and in Robert Lefèvre's full length and showy canvas, representing Napoleon I. in his coronation robes,—a picture which stretched from floor to ceiling, and filled one side of his reception-room.

As an expert in the art of picture restoration, and for the mere pleasure of cleaning them, Dr. Bigelow liked to buy old and dingy pictures at auction. When abroad, in 1881, he spent several days in the workshop of Hoffman, the official restorer of the Amsterdam and the Hague collections; and his interest in the discussion of a subject familiar to himself, but which had been dealt with in empirical treatises only, induced him to have translated into English the authoritative monograph on the "Methods of Regenerating Pictures," by Professor Pettenkofer, of Berlin. His patients would

often find him, seated before a half-cleaned painting, busy with his wads of cotton, his bottles of alcohol and turpentine, rescuing from oblivion the glistening copper utensils, the basket of silvery fish, or the sleeping cat, of some old Dutch painter, and, on one occasion, even a fine example of Zurbaran. His country-house was decorated with the choicest of his renovations. The original and excellent etchings in one of his early surgical papers are still cited in illustration of his multiform accomplishments.

Dr. Bigelow's well-known familiarity with matters pertaining to such an institution led to his appointment as one of the first Trustees of the Boston Museum of Fine Arts, an office which he held until his death. His executive sagacity became of great assistance to the technical administration of this Museum. With strong convictions of its importance, particularly as a school for drawing, he gave much attention to the department of statuary, for a long time busying himself over methods of coating the surfaces of plaster casts with certain chemical preparations, — especially that of Dr. Friedrich von Deschend, of Berlin, applied by atomization, — processes which, without impairing fineness of detail, still permit cleansing, by water or otherwise.

Fearing the possibility of robbery — a danger common to all museums — from cases and cabinets containing objects of great pecuniary, as well as artistic value, and prompted by the insecurity of those already in use, the result of one of Dr. Bigelow's first suggestions was the introduction of new cases, modelled after the pattern adopted by the South Kensington Museum.

Dissatisfied also with their fastenings, he entered into such an exhaustive study of lock-making that his library at one time might have been mistaken for a locksmith's shop. He interviewed lock-makers and lock-pickers. He dissected innumerable varieties of locks, both English and American, and for two years was occupied with an investigation of the general principles of lock construction and the safety valuation of tumblers, curtains, keys, and keyholes. At last he was ready, not only to advocate the necessity of measures for greater security, and to point out the precise lock needed, but to show why it was the best for museum purposes. Watching his opportunity one day when the janitor's back was turned, Dr. Bigelow picked several locks which had been declared absolutely safe, and then asked the guardian why he had left those case doors open. Of course the man stood aghast, but he was soon shown how easily the cabinets could be unlocked.

Dr. Bigelow next demonstrated to the Trustees themselves the correctness of his assumption that the existing locks — made, as he said, by a country lockmaker — afforded small security against theft. With his back turned to those present, he picked a lock similar to those in use in twenty seconds by a stop-watch. Not satisfied with this rapidity, he then repeated the feat in fourteen seconds.<sup>1</sup>

It may be said that a desire to insure the integrity of the Museum stimulated Dr. Bigelow's utilitarian zeal in its behalf. His æsthetic appreciation of its treasures

<sup>1</sup> Appendix VI., p. 295.



was, however, by no means lacking, but it was the interest of a collector and connoisseur, rather than of an enthusiast for art in the abstract.

The last communication which Dr. Bigelow read in public bore the title, "An Old Portrait of a Surgeon." It was about a painting, possessing a good deal of merit, which came originally from an auction, and had hung for nearly forty years in the room of the Boston Society for Medical Improvement. Although a bidder for it himself when it was sold, Dr. Bigelow ceded its purchase to Mr. William Appleton, who not long afterward presented it to the above named society.

The late Dr. Bethune, whose interest in pictures was well known, told Dr. Bigelow that the portrait resembled one of Ambroise Paré, in a folio copy of his works, then belonging to Dr. Oliver Wendell Holmes. A trephine appears conspicuously in the picture; and the fact that this is an instrument specially connected with Paré's name in some degree corroborated this view. The picture had consequently long been regarded as a portrait of the famous surgeon, and was so labelled on its frame.

Discrediting the correctness of this assumption, Dr. Henry I. Bowditch made a communication to the Improvement Society, in 1887, in which he maintained that this painting resembled no existing engraving or portrait of Paré, and did not present the noble features found in other accepted likenesses. He also averred that Paré was not entitled to wear the professional gown in which the subject of the picture was repre-

sented. After some discussion, the name of Paré was erased from the picture frame; but it was done with Dr. Bigelow's disapproval.

In order to settle all doubts authoritatively, Dr. Bigelow instituted a most searching inquiry. He had photographs taken of numerous Paré portraits, collected a great variety of data bearing on the subject, and corresponded with European experts, particularly Dr. Le Paulmier, of Paris, the highest authority on matters pertaining to Ambroise Paré, to whom he sent a photograph of the Boston Society's picture.

This investigation lasted over two years, and Dr. Bigelow eventually discovered that there were two engravings of the portrait in question — one before and the other after the letter — in the Cabinet des Estampes of the Bibliothèque Nationale de France. No duplicate of these could be found elsewhere in Paris, London, or Amsterdam; although one Dutch collector reported to Dr. Bigelow that he had ten thousand engravings of physicians and surgeons in his possession.

The curious medical lore brought to light by this inquest was embodied in Dr. Bigelow's paper, which showed that all authentic portraits of Ambroise Paré resembled each other in one particular, viz. the exceptionally small size of the under jaw, a peculiarity noticeable in the Society's portrait. A singular bit of history proved, furthermore, that Paré was entitled to wear the professional robe.

Nevertheless, the old portrait was not of Ambroise Paré. The two unique engravings, together with other conclusive evidence obtained through Dr. Le Paulmier,

identified it as an original portrait of François Hérard, a French surgeon of eminence, who died in the year 1682, painted at the order of Louis le Grand, by F. Sicre, and engraved by Louis Cossin in the same year.

Nothing could be more indicative of Dr. Bigelow's habitual thoroughness and persistency than his verification of these facts. His paper was accompanied by photographic facsimiles, taken by Adolphe Braun et Cie., of the engraved copy of the painting, and of the two leaves of the "Index Funereus" which refer to Hérard, and also by a photograph of the painting in question itself; all of which were presented by Dr. Bigelow to the Society to which the no longer doubtful portrait belonged.

Frequent allusion has been made to Dr. Bigelow's ardent and lasting love of shooting. Except during the latter part of his life, he devoted several weeks of every year to this sport, and he attributed the maintenance of his generally good health largely to his having done so. He was at home in Currituck Sound long before any of the numerous club-houses which have since been built in that famous resort for canvas-back duck existed. During the Rebellion, when Currituck was no longer accessible, he went to Lake St. Clair. He knew all the best shooting localities, far or near, on land or water. From Connecticut to Canada and the Great Lakes, and along the Atlantic coast from Prince Edward's Island to Florida, was familiar ground to him.

Dr. Bigelow made his own decoys, painting them from the birds they were to represent. Mr. William Sohier, his constant companion in shooting excursions, thinks these decoys were unequalled. After dissecting their windpipes, and satisfying himself how the sound was made, he constructed an instrument to imitate the quacking of ducks. To this day his idea, patented by some one else in the shape of a wooden call, is sold in gun-shops; but this imitation is said to be much less satisfactory than the original, which was made of metal. He bred shooting dogs, — pointers, and especially the famous breed of Currituck retrievers, commonly known as "Chesapeake." He went into the refinement of guns, and owned one of the first, if not the very first, chokebore ever made.

Dr. Bigelow enjoyed recalling the many adventures and episodes of his shooting excursions. The half-civilized Indian guides and boatmen at Lake St. Clair were dangerous men, whose conduct at times justified his precautions when among them. His trunk, heavy with cartridges, was pried open in his room at a hotel, and everything in it turned topsyturvy. Cartridge after cartridge was torn apart, evidently under the delusion that they were *rouleaux* of coin. He encountered eccentric characters, and met with rough and sometimes hazardous experiences. Such reminiscences, enriched by the varied incidents derived from his acute observation of men and natural phenomena, wiled away many an agreeable evening before the fire at his home on Tuckernuck.



The sheep commons of Nantucket had long been familiar to Dr. Bigelow as good shooting ground. The healthful and refreshing climate of the locality, and its peculiar attractions for recreation and sport, led him to become the owner of a considerable part of Tuckernuck, an island lying west of Nantucket, and so near as to be almost a part of it.

Its eastern end alone was inhabited, and this only by a few families of fishermen. Dr. Bigelow accordingly built himself a rough house on the extreme western point, where the prevailing breezes, coming off the water from every point of the compass but due east, insured unvarying coolness and comfort in the hottest days of summer. Here he usually spent eight or ten weeks of unconventional outdoor life, offering a most delightful and informal hospitality to his own and his son's more intimate friends.

The solitary inaccessibility which impressed the visitor to Tuckernuck for the first time, and which was its great allurements in Dr. Bigelow's estimation, soon became an enjoyment and a pleasure to every guest. Here the days sped only too fast. A sea bath, a siesta in the shade, a stroll, a search for Indian arrow-heads, or some discussion of the floral and insect life of the neighborhood,—to which the nearness of the Gulf Stream imparted an exceptional character,—afforded occupations enough, brightened as they were by the mirth of Dr. Bigelow, by his wise and informing talk, or his observations on the curious facts of nature with which the island is replete. That he knew well how to observe these diversified phenom-

ena is shown by his early, and indeed independent, recognition of what are called "facetted stones," — existing in great numbers in this locality, — and his sagacious conclusion, some twenty years ago, that their peculiar configuration was due to the action of "sandblast," — a fact to which scientific attention has recently been directed.

Pet animals were always about, — a monkey or two, some puppies, or a flock of terns, caught young and domesticated, who came home to roost like chickens, and sat about the piazza clamoring open-mouthed for supper. For a number of years Dr. Bigelow paid unceasing tribute to the remarkable aquatic instincts and habits of a fine Chesapeake dog, who first won his attention by the intelligent recovery of a heavy catch of fish, accidentally lost overboard by the upsetting of a fisherman's boat in the surf. A mischievous genet, with a nocturnal habit of eating up head-gear, slippers, etc., was tolerated chiefly for its feline beauty. A comical sketch, by Dr. Bigelow, of a visitor's morning dismay at finding only the remnant of his hat, was superscribed : —

"Fig. 2. See Professor E. S. Morse's remarks before the American Odontological Association, — 'The destructive effect of the teeth of the *Genetta Tigrinus* upon manufactured wool.' Report and protest. — Tuckernuck Transactions, August, 1883."

The spreading expanse of level upland in the vicinity of the Tuckernuck house was a favorite resting-place for plover in their southern migration. Their arrival was always looked for on the twenty-seventh of

August, and the decoys were then put out; but latterly Dr. Bigelow grew more and more disinclined to indulge in shooting, till at last the pit and its comfortable rocking-chair, from which he took unerring aim, was almost deserted. As the birds strutted about in the grass, he took pleasure in watching them through a powerful spy-glass, and encouraging them to alight in his field, rather than in frightening them away.

An informal diary, kept by Dr. Bigelow's classmate, Mr. W. W. Greenough, during a visit of several weeks, affords graphic glimpses of the place and of the life at Tuckernuck:—

*June 30.* We arrived at an abnormal house, arranged and built some fifteen years ago, in the simplest manner possible, with no plaster, no ceilings, only one sitting-room,—which is also the room for meals,—and a piazza in front. Behind this are the kitchen and offices, and overhead the bedrooms. On the whole it is the most original and well conceived summer house, for men only, that I ever saw,—suited perfectly for one who does not need superfluities, and aims only at essential comforts.

It looks out on the Muskeget Islands and the Atlantic on the west and north, i. e. with no sight of the mainland. The existence and surroundings are novel. No conveniences are established for a possible woman. Connection with civilization, in the way of letters and newspapers, is distant two or three days. The yacht comes and goes as occasion requires. Yet I can see that the whole condition of existence here is like balm to the soul of a tired worker. These are first impressions.

*July 8.* Never knew what bluefish were, in quality, till eaten fresh. Have one at every meal,—which is very satisfactory.

*July 4.* The quietest Fourth ever spent by me in the United States. No sound of cannon! Quiet as Sunday,

when no church bells ring! Hardly a sail in sight! Weather fine.

*Sunday, July 7.* One's life here is narrowed to the duties of keeping alive and in health. Anxiety and care are now matters of apprehension, and not of daily struggle. I am no longer a husband, a parent, a lover, a friend, or daily laborer, —not "cabined, cribbed, confined" in a cage of daily entrance. The curtain which shuts me in to my responsibilities is now lifted, and I breathe for a space freely. He is "the freeman whom the truth makes free," says the poet; but the truth cannot lift off his daily burden of toil, and anxiety, and responsibility. Have read more poetry to-day, from Epes Sargent's excellent Cyclopædia, than in any day for years, —and with more feeling and apprehension of beauties.

*July 8.* It is curious to see the Doctor entirely denying himself any head covering, —hat, cap, or coat, —walking about as if he never had worn anything on his head, sitting in a July sun with perfect indifference. It is gratifying to see a man who knows what he wants, and does what he chooses, without let or hindrance, and always with kindness and hospitality; — *non nobis solum*, which everybody does not recognize in him. He gave me an account to-day of his visit to the Peninsula, in the Seven Days' Battle time before Richmond; reminiscences of Mr. Abbott Lawrence in London; introduction to the Iron Duke, etc.

*July 10.* Dip in the sea before breakfast, 8 A. M.; temperature 74°; wind southwest. Read a chapter or two of Pickwick. Had some desultory talk. Did not feel much like doing anything. Had two naps in the course of the day. After dinner overlooked the new steps constructing on the bankside. In the evening reminiscences of London, of the Doctor's life, and so on. The quietest day yet spent here, —and very soothing.

*July 13.* Too much good living and too little exercise. Felt better during the day, and ate a good dinner.

*July 16.* A dreamy, lazy sort of a day. Watched the clammers, the ospreys, and the terns. A fisherman just pass-



ing in his sailboat took two bluefish in less than a minute from his trailing lines. We saw a boat on the south side, evidently arranged for swordfish, now plenty in these waters. Yesterday the Tuckernuck caught or harpooned three, — to-day, two. This fish finds a ready market at Nantucket.

*July 17.* The Doctor took a photograph of me, which has a resemblance to the original, but will be better when printed. The outward clothing does not belong to the civilization of my daily life at home.

*July 18.* Two young girls of the island, twelve and fourteen years old, called just before dinner. One of them told me what the wrecks were in front of the house in the distance: the "Lysander Stone," towards us at the extreme left, which I had made out with my glass; the next was the "Samuel Ford," the next the "Dolly Varden," and the outside one, to the right, the "C. E. Ropes."

*July 19.* The first mowing machine brought to Tuckernuck arrived on the Doctor's order this morning, and was duly set up. The southeast wind blew in to-day a new variety of insects, which settled in clouds on the leeward side of the house. In general appearance they were like mosquitoes, but without the sting. The beetles, who began last week to visit the lamps in the parlor about 8.30 o'clock, have pretty much disappeared, and new and smaller varieties came last night.

*July 21.* I took a stroll over the beach to the North Pond, and on my way back picked up over twenty varieties of scallop shells, different in color and marking, shading from white to brown; some of them very striking, and unaccountable for shades of color.

*July 22.* The important news arrived to-day that the Doctor's married monkeys have a descendant, — the second native-born monkey in the United States. Sex not known.

The hours here are painfully early. The Doctor retired to-night at 8.15, Mr. Hinckley at 9 o'clock, and I followed at 9.45.

The mowing machine mentioned in this diary was intended for cutting down the stubbly pasture grass,

that the plover might have a better chance at the grasshoppers and other insects on which they feed. At one time Dr. Bigelow tried to accomplish this purpose by a large flock of sheep, but the experiment did not prove a satisfactory one.

The simple yet fascinating attractions of Tuckernuck never failed to impress every fortunate visitor to this unique and peculiar spot, admirably adapted not less to the recuperation of many an overworked or invalid friend of Dr. Bigelow than to the exuberant activity of youth or the more sedate enjoyment of older men.

Having by degrees relinquished practice, the last years of Dr. Bigelow's life were devoted to the creation of a country seat on a beautiful hill at Newton, a few miles from Boston, which he had selected with his habitual care as a spot sure to fulfil his requirements and gratify his tastes.

Oak Hill, one of the larger drumlins or lenticular prominences of glacial formation common in Eastern Massachusetts, has long been known to pedestrians for its magnificent view, compassing three quarters of the horizon, beginning at Mount Monadnock, in the northwest, and stretching to Boston Bay in the southeast, with the Charles River wandering through the meadows of the foreground.

Crowning the summit of Oak Hill, and accessible by a long avenue, — winding its zigzag way through wild roses, brambles, barberry bushes and small savins, but ending in rhododendrons, exochordias, and flower beds, — is the long, low, and odd wooden house, upon

which Dr. Bigelow lavished his own constructive ingenuity, though its architecture was designed by H. H. Richardson.

So gradual is the encircling slope, that from the immediate vicinity of the house only the lawn and shrubbery close at hand stand between the spectator and the distant view. No other dwelling has a foothold on the hill. An "audible silence," to which Dr. Bigelow often invited attention, and an apparent isolation, predominate in the charms of this situation, the centre of a superb panorama.

Here Dr. Bigelow's interests now converged. In the building of the house his was the controlling spirit; and when this was completed he found daily occupation, in bringing order out of the residuary chaos, and in the improvement of this wild and uncultivated domain, most of which he aimed to preserve in all the simple beauty of its natural state. Even the subjects of scientific road-building, and binding gravel, claimed his close attention. To what the latter owed its peculiar qualities, and why one kind was better than another, were to him matters of actual microscopical study. The scratched and scored boulders bequeathed by the receding glacier awakened a fresh interest each time they were turned up from the soil. The flat surface of one of the largest and best marked was converted into a doorstep, whereof he was justly proud. The botanical tastes of boyhood came back to him. With his wonted power of appropriating information, he quickly became skilled in horticulture. His collected catalogues of nurseries and gardeners, in all

parts of the world, were a curiosity. A friend, writing to Dr. W. S. Bigelow, then in Japan, tells him: "Your father spends his time trying to make plants grow on the top of a hill in New England which the Lord intended should grow in a swamp in the tropics; and the curious part of it is that he seems to succeed."

It so happened that at this period the famous Hovey's Nursery, at Cambridge, was coming to the close of its long career, and its treasures were being scattered by the inroads of suburban building. From it he obtained the best specimens of shrubs, fruit, and full-grown ornamental trees, among which were some veteran rhododendrons of exceptional size and beauty, the successful transplantation of which was mentioned in the agricultural papers at the time as being without a precedent.

England and the Continent, as well as America, contributed to his fields and gardens. Mild winters mitigated the retarding influences of transplantation; and the results of Dr. Bigelow's industry were so marvellous, that by the end of two summers the barren hill had been transformed into compact grassy lawns, with a wealth of foliage and flowers.

His pear trees, which, like the rhododendrons, were so large that it had been prophesied they never could be successfully transplanted, were full of fruit, and the supply of melons and strawberries was unmeasured. His playful humor gave names to shrubs and Conifera, whenever an eccentricity of growth or shape suggested to his exuberant fancy some comparison with individuals or objects. Squirrels and song-birds were pro-



tected, and encouraged to frequent the place, and pigeons again fluttered about the stable roof. The situation inspired him with its beauties. The green grass, the bloom of the trees, the looming mist in the valley at sunrise, and the distant peaks of Monadnock and Wachusett, as they stood outlined against the evening sky, filled him with delight.

Here Dr. Bigelow passed two happy seasons, beginning with each year's early springtime, and ending only when frost and snow put an end to outdoor occupations. Here, also, in the third year of these pleasure-giving scenes, — in the midst of plans for new rose beds and clumps of shrubbery, with countless horticultural importations arriving daily and importuning his attention, — ill health overtook him.

Though reticent in regard to his physical condition, Dr. Bigelow was known not to be robust, and to be watchful to keep himself well. His former pulmonary symptoms had entirely subsided, and he had recovered from the illnesses of his middle life without impairment of his general health; but he had been deeply afflicted by the circumstances attending his resignation at the Massachusetts General Hospital, and was never the same afterward. They caused a modification of plans nearest his heart, and perceptibly aged him in the eyes of his friends. By the overturn of a carriage, in which he was driving to Oak Hill, he had received a blow on the head, which was followed by a long sickness, apparently referable to that injury; but the ultimate cause of his death was not connected with this accident.

Habitually, and under all circumstances, Dr. Bigelow was the most abstemious of men; but his digestion, never perfect, although always prudently cared for, slowly ceased to be accomplished. A bad cold was succeeded by an attack of gastric pain from which he never recovered. The simplest food occasioned extreme suffering, and a progressive failure of strength took place. He became convinced there was a gradually increasing contraction of the outlet of the stomach, and that a fatal result must be expected. For several days before he died he took nothing but water.

His mind remained bright and clear till very near the close of life. With unclouded judgment he noted the indications of approaching dissolution. Uncomplaining, quietly demonstrative to those about him, and with a placid composure, slowly and serenely he ceased to live.

Dr. Bigelow's death occurred on Thursday, October 30, 1890. His funeral, largely attended, took place on Saturday, November 1, in Trinity Church, Boston, the Rev. Phillips Brooks, D.D., reading the service. He was buried at Mount Auburn Cemetery, in the lot which had belonged to his father.

Elaborate obituary notices of Dr. Bigelow were printed in the daily newspapers of Boston, and in the medical journals of this country, Great Britain, and India. Resolutions of respect to his memory were adopted by the Harvard Medical School, by the Trustees and the Surgeons of the Massachusetts Gen-

eral Hospital, by the Council of the Massachusetts Medical Society, by the Suffolk District Medical Society, by the Boston Society for Medical Improvement, and by the Boylston Medical Society.

At a Memorial Meeting of the Society for Medical Improvement, held November 19, 1890, many distinguished guests not of the medical profession being present, addresses were read by Oliver Wendell Holmes, Henry Lee, R. M. Hodges, D. W. Cheever, and Hasket Derby. These addresses, together with papers by R. H. Fitz and A. T. Cabot, were published in a special Memorial Number of the "Boston Medical and Surgical Journal" for November 27, 1890, which also contained a noble photograph of Dr. Bigelow, taken by his friend, Mr. Arthur Dexter.

Of these generous tributes, it cannot be deemed invidious to particularize those by Oliver Wendell Holmes, — more especially a Memoir prepared by him for the American Academy of Arts and Sciences, in which a keen perception of Dr. Bigelow's characteristic traits, acquired during a long intimacy, and an appreciative estimate and critical analysis of his principal contributions to science and medical literature, are woven into eulogium with all the genial and consummate art of this inimitable writer.<sup>1</sup>

A post-mortem examination of Dr. Bigelow's body revealed the correctness of his own diagnosis, — a non-malignant thickening of the pyloric orifice of the stomach.

<sup>1</sup> See page 183.

The cicatricial evidence of an arrested pulmonary disease, the amount being very slight, was discovered at the apices of both lungs. There were also traces of a chronic pachymeningitis, doubtless the result of his recent accident; and "it was noted that the convolutions of the brain not only presented unusual complexity, but were very deep, suggesting an uncommon amount of vesicular matter."

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The "fair, large front" of Milton's typical man found its presentment in the intellectual head of Dr. Bigelow. His tall, slight, but manlike figure, and his elastic step, betrayed his nervous organization. His refined and well moulded features, — unobscured even by a full beard, — and his agreeable voice and manner, always attracted interested attention.

A man of mark in any gathering, no self-assertion was needed to make his presence felt. His mental faculties were sensitive to the slightest touch. Whenever the moment for action arrived, he was always ready; and when a crisis demanded it, he could put forth the energies of a gladiator. Opposition might sometimes excite a spark of irritability, but never involve the loss of self-command.

He discerned the motives of men, and, as has been said, "would have excelled as a leader in government or diplomacy." He could sagaciously foresee the coming of a distant issue, and adroitly intercept its antagonistic advance. He had a self-collected, serene ambition,



and the power of deliberately forming and carrying out a purpose. Endowed with untiring perseverance, he rarely failed to accomplish his object. Although vehement in asserting his convictions, and sometimes disdainful of what others thought who differed from him, he was no more intolerant than strong men often are who have the confidence and courage of their convictions. Dr. Holmes said, in his address before the Society for Medical Improvement : —

“When he was deeply in earnest, he had a peculiar movement by which I could always tell that the powerful brain was at work, as well as I knew that the steam was up in the boiler of an engine when I saw the walking-beam in motion. Some of you must remember that flexing and extending of the right forearm, which always meant there was lively action going on in that capacious and vigorous mental engine-room.”

He loved knowledge for its own sake, not less than for the intellectual pleasure of its acquirement. He saw where light was needed and expansion possible. He followed an investigation patiently, indefatigably, and thoroughly, if not rapidly; and rarely, despite the allurements of preconceived ideas, did he jump at unfounded conclusions. He solved old problems in surgery, and was the pioneer in paths hitherto untrod.

Habitually looking beneath the surface, he was seldom content with any explanation until he had himself failed to find some different meaning. He disliked the beaten track; if he could not find a better way, his ingenuity would always suggest another quite as good. Sir Philip Sidney's motto, “*Viam aut inveniam aut faciam*,” might well have been Dr. Bigelow's also.

He never mistook words for ideas. He had none of that enthusiasm which accepts novelty for value. He could not tolerate unstable theories and gratuitous assertions, nor did current credulity ever dupe him into acquiescence with charlatanry.

Esteeming erudition highly, and always ready to learn by inquiry, he was nevertheless not a reader, unless he had a definite object in view; and then, as Dr. Holmes has said, "He could get what he wanted for his particular purpose out of a book as dexterously, as neatly, as quickly, as a rodent will get the meat out of a nut." The faculty of grasping what he wanted, in the midst of rubbish he did not want, was born with him, — a paternal inheritance.

His writings are almost entirely free from literary references. Until his own work was accomplished, he seldom tried to ascertain what his predecessors had done; but then he would look the matter up, or interrogate some encyclopedic friend, like the late Dr. T. B. Curtis, whose early death no one deplored more sincerely, or Professor Fitz, and learn what the literature of his subject had to say. If some one had preceded him, the pleasure of his self-taught knowledge was impaired.

He was a forcible, if not an easy writer. His revisions were endless; for his endeavor was to express himself with concise clearness, or, as he said, "to knock out every superfluous word." The list of his publications is not a long one, but, as has been remarked, "it is weighty with original thought and practical research."

He was never willing to gather fruit already fallen from the tree, or to stamp inferior productions with his own countersign. In acceding to a request for a catalogue of his printed papers, Dr. Bigelow wrote : —

“ Although, like others, I have often been asked to *compile* articles or books, I have done so but once, — a Prize Dissertation in 1844, published, but not mentioned here. On the other hand, the little I have written was a concise account of something new and of value, which no one else could have written because no one else was cognizant of the facts in question. Such papers, from their brevity, often assumed the form of a journal article.”

As a writer and teacher, his aim was to make doubtful knowledge certain, or else to transfer it into the region of definite ignorance, — “to make wonders plain, and not plain things wonders,” — and to present a subject so clearly and completely that it should be finished work. In the construction of his evacuator and his lithotrite, for example, he met every needful and essential requirement ; and no modification of these instruments has yet developed any improvement of which the principle was not embraced in the originals.

His great desire was to improve his art ; and the more he accomplished in that direction, the more critical he became. How far he advanced surgery is a question answered by his searching studies in dislocations of the hip joint, and in lithotrity ; subjects made not merely a field of inquiry, — others had done that, — but mastered and rendered more intelligible than ever before.

Influenced by his own aphorism, — “The secret of profitable observation is not only to observe accurately, but to know what to observe,” — he wasted little time over insurmountable problems, but went straight to those which commended themselves as practically useful.

When, in Dr. Holmes’s presence, it was regretted that so intellectual an investigator as Dr. Bigelow did not apply himself to the larger problems of medical philosophy, his colleague’s reply was: “I would not go so far as that, remembering his identification with the subject of ether, together with all that he accomplished in the improvement of mechanical surgery, and the amount of human suffering which his inventive genius has relieved.”

There was a mystic bond of fellowship between Dr. Bigelow and all experts in any line of business, whatever their station might be; and intelligent men, even if untutored, — like some mechanics in the workshops he frequented, the sailing master of his Tuckernuck yacht, the janitor of the Medical School, the old ward tenders at the Hospital, — looked almost with reverence upon a man who oftentimes knew more about their vocations than they did themselves.<sup>1</sup>

In his hours of relaxation, no one unbent more easily, or was a more agreeable and lively companion. In the privileged circle of his acquaintance there were many men and women, familiar with the softer features of his disposition, who were bound to him by strong and steady affection. With an unobtrusive charity he

<sup>1</sup> Appendix VII., p. 296.



opened his purse to children and working-women, not the recipients of conventional almsgiving, and whose temporary wants, from sickness or enforced idleness, appealed to his sympathy. He never gave from mere impulse, but guided by his own judgment he dispensed money with a liberal generosity; and his acts of benevolence were known to few beside himself.

Although Dr. Bigelow took little active part in the public enterprises and charities which engaged the interest of some of his friends, and occasionally seemed to be unmindful of the joys and sorrows of those among whom he was born and bred, — as has been said with regret rather than disaffection, — it is still admitted that, if his life had been less retired from the world, he never could have accomplished the work which his active temperament compelled him to undertake, or attained his rank among the benefactors of mankind. “Gregarious or solitary habits are only a peculiarity in the mental machinery of individuals,” was his own epigrammatic answer to remonstrances against his seclusion. He created his own environment; and he shut himself out from the fellowship and the pursuits of the many, that the door might be open to the speculations of his own rather than of other men’s minds. He was never less alone than when alone.

In his Academy Memoir, Dr. Holmes says of Dr. Bigelow: —

“He was unquestionably a man of true genius. Sagacity in divining the truth, the power of continuous, patient, and searching investigation, inexorable determination to have the truth, if Nature could be forced to yield it, characterized his

powerful intelligence. He inherited a distinguished name, and his labors have rendered it memorable and illustrious,—one of the brightest in the annals of American surgery, not to claim for it a still higher place in the history of the healing art.”

It might be added, that it would be hard to name any other man with so much reputation and so little affectation of learning, or one who blended so much enterprise with so little extravagance.

Dr. Bigelow lived long enough to see and feel that he had played no unimportant part in the changes in medical opinion and education since his own youth. He died leaving the impress of his character and his genius stamped deep upon the surgical history of his time.

MEMORIALS, RESOLUTIONS,  
AND  
OBITUARY NOTICES.





## MEMOIR OF HENRY JACOB BIGELOW.<sup>1</sup>

BY OLIVER WENDELL HOLMES.

HENRY JACOB BIGELOW was born in Boston, March 11, 1818, and died in Newton, Mass., October 30, 1890. He was the oldest of five children of Jacob and Mary (Scollay) Bigelow. His father was distinguished in various branches of science and literature; he was a former President of the Massachusetts Medical Society, and a President of this Academy; a man of great ability, a leading practitioner in Boston during his long life, and especially memorable as the founder of Mount Auburn, the earliest of our garden cemeteries. His son inherited many of his father's qualities. After attending Mr. Thayer's school, which he entered in 1826, he joined the Latin School, then under the charge of Mr. Leverett. When Mr. Leverett left the Latin School and established one of his own, he followed his instructor, having among his schoolmates William M. Evarts and William W. Greenough. He entered Harvard College in 1833, graduating in 1837. "If he does not become a distinguished man," Dr. James Jackson is reported to have said of him, "it will be because Boston is not a large enough field for his ability."

Mr. Henry Lee writes an interesting account of the early years he and Henry Bigelow passed together, from the age of three until Mr. Lee left to go to college, a year before his companion. He describes his young friend as a slender boy,

<sup>1</sup> Reprinted from the Proceedings of the American Academy of Arts and Sciences, Vol. XXVI.

lithe and active, a good gymnast and dancer, and full of contrivances and ideas of all sorts. He had a rather remarkable facility for mechanical work, — took early to shooting, a taste which lasted to the later years of his life; he was also fond of bird's-nesting, with the usual knowledge, or rather more, of birds and their haunts and habits; like his father, he had a taste for botany, which came again very strongly in his later years. He was a fair though not remarkable scholar, through school and college.

He early showed his independence of character. There was a rebellion while he was in college, and anxious parents went out to look after their sons, — among them Dr. Jacob Bigelow, who remonstrated with Henry. The latter reminded him that there was a rebellion in his own day. "Yes," said his father, "but I have seen the folly of it." "Well, I want to see the folly of it, too," was Henry's (characteristic) answer.

He graduated with respectable rank in 1837. After leaving college he had threatening symptoms of pulmonary disease, for which he went to Havana; but he was able to continue the study of medicine which he had already commenced, in the prosecution of which he went to Europe, passing his time chiefly in Paris, visiting London, more especially to hear the lectures of Sir James Paget. He took his medical degree at Harvard University in 1841, and entered upon practice in Boston. He had determined to devote himself to surgery, and soon found himself in active business.

In connection with Dr. Henry Bryant, he established a kind of surgical dispensary, which was the subject of no little comment and some harmless satire from unknown rivals, which amused him and his friends as much as it did any of the medical community.

He soon became known as an enterprising and aspiring practitioner, who was mapping out his own path, deterred by no fear of rivals, and not afraid of his critics.

First on the list of Dr. Bigelow's published writings stands

a "Manual of Orthopedic Surgery," being a Boylston Prize Dissertation for the year 1844.

The Boylston Prize Fund was provided by the generosity of Ward Nicholas Boylston, a Boston merchant. Its two annual prizes, of fifty dollars each, invited the competition of the younger members of the medical profession, and the gaining of them was a favorable introduction of the young practitioner to the medical world and the general public. The question, or one of the questions, for the year 1844 was the following: "In what cases, and to what extent, is the division of muscles, tendons, or other parts, proper for the relief of deformity or lameness?" Dr. Bigelow did not confine himself strictly within the limits of the question, but extended his labor until it took the form of the Manual above mentioned, an octavo volume of more than two hundred pages. This was a systematic and lucid treatise, far beyond the ordinary standard of the annual dissertations in scope and completeness.

For more than thirty years — from 1849 to 1882 — he was Professor of Surgery in the Medical School of Harvard University. In 1847 he was appointed one of the surgeons to the Massachusetts General Hospital.

During all this active period of his life, he published many important papers, bearing more especially upon, but not confined to, surgical practice. A list of some of the more important of Dr. Bigelow's contributions to medical literature is furnished by Dr. R. H. Fitz, at the close of his tribute to Dr. Bigelow at the Memorial Meeting of the Society for Medical Improvement.

The second publication on that list is entitled "Fragments of Medical Science and Art." Under this head is printed "An Address delivered in 1846."

The great aim of this essay is to show the importance of the imagination in science. The "Numerical Method" of Louis was at that time looked up to, by the more ardent disciples of that admirable observer and teacher, as the master-key which was to unlock all the secrets of disease and

its remedies. Observe all the facts in a case, in a hundred or a thousand cases; tabulate them, add, subtract, multiply, divide them, and the laws of pathology and therapeutics will come out in your sums and quotients as inevitably as a clerk's balance at the end of his account-book. Dr. Elisha Bartlett's "Philosophy of Medical Science," published in 1844, presented the Numerical Method in a form which might be thought to exclude the imaginative element, and reduce the man of science to a mere statistician.

Dr. Bigelow's essay was a vindication of the true office and the importance of hypothesis. To illustrate his argument, he appealed to the history of great discoverers and inventors, of Copernicus, of Kepler, of Newton. "I am aware," he says, "that this position, namely, that hypothesis is essential to the discovery of scientific truth, is not recognized by many philosophers, especially in medical science of the present day. Bacon himself, feeling that unfounded theory, gratuitous assertion, had been a stumbling-block to all preceding science, was led to attaching too exclusive value to facts. 'We must not imagine or invent,' he says, 'but discover the acts and properties of nature.'"

In the face of Bacon's proposition, in the presence of the champions of the statistical school of observers, Dr. Bigelow maintained effectively and convincingly the true office of that higher faculty, which, instead of counting columns of figures, sees, in virtue of its special gift of insight, the hidden relations between a few facts remote from one another to all appearance, but which, connected by an hypothesis, are often verified by large observation, and become a part of accepted knowledge or true science.

It was not so much the originality of the thesis maintained by Dr. Bigelow as the reasonable and forcible method by which he expounded and illustrated it, and the peculiar fitness of his choice of a subject at that particular time. He knew when to strike, as well as how to strike. One of the most distinguished of our Boston practitioners said to me that he almost regretted Dr. Bigelow's having given so much



time to special practical points, instead of applying himself to the larger problems of medical philosophy. I would not go so far as that, remembering how much he accomplished in the improvement of mechanical surgery, and the amount of human suffering which his inventive genius has relieved; but, after reading this essay, one may be pardoned for regretting that so good a thinker and reasoner was willing to allow his skilful handiwork to usurp so large a portion of his time and labor.

Had Dr. Bigelow left no other record, the association of his name with the great inventive discovery of artificial anæsthesia would preserve his memory to the latest period of civilization. On the evening of November 2, 1846, he called at my house in Charles Street with a paper which he proposed reading at the meeting of the American Academy of Arts and Sciences, to be held the next day, and which he wished me to hear. He began by telling me of the successful use of the inhalation of a gas or vapor which produced insensibility, during which a capital operation had been performed at the Massachusetts General Hospital. He was in a state of excitement as he spoke of the great discovery that the gravest operations could be performed without the patient's knowing anything about it until it was all over. In a fortnight, the news of this wonderful discovery, he said, will be all over Europe. He then proceeded to read to me the paper he had prepared, — the first formal presentation of the subject to the scientific world. The following is the official report, copied from the records of the Academy:—

“ November 3d, 1846.

“ Dr. Henry J. Bigelow read a paper giving some account of the new method of inhalation employed by Dr. Morton of this city to produce insensibility to pain during the performance of operations by the dentist and the surgeon.”

No person took hold of Dr. Morton's discovery with such far-seeing, almost prophetic appreciation as the young surgeon who had been but a few years in practice, and who

threw all the energy and ardor of his early manhood into his advocacy of the new and startling innovation which was destined to change the whole aspect of surgery. It was not merely by his sagacious foresight that he recognized the importance of this epoch-making novelty, but throughout its subsequent history, until its universal acceptance, he was the foremost champion of the claim of artificial anæsthesia. After the use of chloroform was introduced Dr. Bigelow remained faithful to the original anæsthetic agent, and was always ready to do battle in the cause of ether as against chloroform, which, though more convenient, and in many cases useful, is a more dangerous agent than the other. His writings on this subject extend through a period of thirty years, from 1846 to 1876.

In the year 1850 Dr. Bigelow published a remarkable article on a case which may be considered on the whole as the most extraordinary in the annals of surgical injury. This was the famous "Crowbar case," the account of which seemed to many incredible, and its mechanism beyond explanation. The story was briefly this. A man was ramming down a charge of powder in a hole drilled in a rock, when the charge exploded, and the tamping iron, — a short round bar, — was driven up through the side of his face, out at the top of his head, breaking upward through the top of his skull as if it had been pie-crust, shooting up into the air, and falling at some distance. Dr. Bigelow accepted the story as true, and undertook to show how the bar could have found its way up and out through the bones of the face and skull, traversing the brain, and cutting one of the optic nerves on its way. He prepared a skull to illustrate the course taken by the implement. The subject of this extraordinary accident lived many years, but an opportunity was found to inspect the injured parts after death, and Dr. Bigelow's explanation of the accident was fully confirmed.

In the midst of his scientific researches Dr. Bigelow never forgot the practical aim and end of the healing art. He cared quite as much for "common sense" in a medical man

as he did for scientific acquirements; indeed, he rather undervalued pure science as compared with practical skill. His lectures are eminently practical, and most of his scientific researches tend to some important curative purpose. No man knew better than he what were the needs, and what should be the training, of the young practitioner who would make his way in the world; and his Lecture on "Science and Success" gives some of the best results of his wise experience.

In 1869 he published his essay, "The Mechanism of Dislocation and Fracture of the Hip." This subject had been long and diligently studied by the great surgeons of the past, more especially by Sir Astley Cooper. Dr. Bigelow threw new light upon the whole matter. I have requested Dr. Richard M. Hodges, who knew the history of Dr. Bigelow's researches more intimately than any other of his pupils and assistants, to make a brief statement of the leading points of his doctrine and practice in dislocations of the hip. The following is his answer to my request:—

"*Hip Dislocations.* — Although Winslow and Weitbrecht had described the two fasciculi of the ilio-femoral ligament, or ligament of Bertin, Dr. Bigelow first drew attention to the great strength of the anterior part of the capsule of the hip joint, and defined with precision the two bands of the above named ligament, diverging like the branches of an inverted Y.

"Dr. Bigelow showed that, so long as it remained unbroken in one or both of its branches, the Y ligament dominated all the dislocations of the hip joint with established features, and that it was the chief obstacle to reduction; the muscles playing only a subordinate and occasional part in giving position to the limb, or in hindering the reduction.

"Dr. Bigelow classified dislocations of the hip into Regular and Irregular.

"The regular dislocations, seven in number (four of them being new varietics), are those in which, one or both branches of the Y ligament being unbroken, the head of



the femur is thereby held near the acetabulum, and their signs are constant.

"The irregular dislocations are those in which the Y ligament is wholly ruptured, and they therefore offer no constant signs. The head of the femur, being loosed from the acetabulum, is free to go anywhere.

"In the regular dislocations, manipulation of the Y ligament will alone effect reduction.

"The principle of this manipulation is flexion, which is efficient because it relaxes the Y ligament.

"The Y ligament being flexed, and therefore relaxed, the head of the femur is drawn or forced into the desired direction by 'traction,' which disengages it from behind the acetabulum and directs it toward the socket, — or by 'rotation,' which winds the Y ligament around the neck of the bone and so shortens it, thus compelling the head of the femur, as it sweeps around the acetabulum, also to approach the socket, into which it can be easily lifted.

"Dr. Bigelow converted random, ill devised, and fruitless movements into accurately conceived, instructed, and well directed manipulation."

Growing out of his investigations of this subject was his original study of the anatomical neck of the femur. By a series of parallel sections through the head and neck of the bone, he demonstrated the column or lamina of condensed bone in the midst of the cancellated tissue forming a line of support rendered necessary by the obliquity of the neck of the bone.

In 1878 Dr. Bigelow published his essay, "Lithotrity by a Single Operation," of which Dr. Hodges speaks as follows:

"*Rapid Lithotrity with Evacuation at a single sitting; or Litholapaxy.* — The normal urethra having been shown to admit instruments of greater size than surgeons had previously supposed possible, Dr. Bigelow constructed a lithotrite, improved in many of its details, (especially by devices which prevent the blades from clogging or becoming impacted with crushed material,) of a size much larger than had before



been used. This permitted the attack of calculi exceeding in dimensions the limits previously thought allowable by crushing alone, i. e. without evacuation.

“Dr. Bigelow also constructed thin silver tubes, easy to be introduced, notwithstanding their large size (27–31 Charrière), through which evacuation of the crushed stone was made practicable by means of an elastic exhausting bulb of sufficient suction power to draw out the fragments previously comminuted to a size enabling them to enter and pass through the tube,—pulverization being no longer essential.

“Dr. Bigelow established the fact that with these instruments a sitting—two minutes having been, up to that time, assigned by Sir Henry Thompson as the proper average duration—could be prolonged, with the aid of anæsthesia, one to two hours, harmlessly for the patient and without detriment to the bladder. ‘Lithotritry with a single sitting’ has been shown to have a mortality less than that of ‘Lithotritry with many sittings,’ and it has entirely superseded the latter.

“The operation of Litholapaxy, at first supposed applicable only to adults, has been within the last few years extended in its use to children from two years of age upwards, with great success. They have never been supposed to come within the scope of old-fashioned lithotritry. This practice, adopted originally in India (Lahore), has latterly been introduced in England and America.

“Dr. Bigelow’s invention may justly be said to have acquired a world-wide reputation.”

I add a few words to this description by Dr. Hodges. He was led to think that a principal source of failure in that operation was the irritating effect of the fragments of stone allowed to remain in the bladder, which left it inflamed and sensitive, not in condition to be the subject of a second or third operation. If the bladder could be completely cleared at one sitting, this danger could be avoided. To effect this object, he designed new instruments, or modified such as were in use, so as to make them serve his purpose. He

spared no pains in perfecting his apparatus. It is not to be supposed that his surgical innovations were at once accepted without question or opposition. The end of it all was, that his principal rival in the treatment of calculus, Sir Henry Thompson, became a convert to Dr. Bigelow's mode of dealing with stone in the bladder, and that this new method of operation is generally recognized as one of the great improvements of modern surgery. I myself had the opportunity of observing some of his experiments, and well remember the patient and persevering labor they involved. I recollect, more especially, the pains he took in getting plaster casts of the bladder and the urethra, and I learn from others that he bestowed the same care upon the instruments he contrived or adapted for the rapid removal of a calculus, by the method to which he gave the name of Litholapaxy.

Among Dr. Bigelow's other professional labors, I may mention his suggestion of a new refrigerant for producing local anæsthesia. This was brought forward in an article published in the "Boston Medical and Surgical Journal," in 1866, under the title, "Rhigolene, a Petroleum Naphtha for producing Anæsthesia by Freezing."

A new anatomical observation was published by Dr. Bigelow in the same journal, in the year 1875, "Turbinated Corpora Cavernosa." The anatomical expert will recognize at once the analogy hinted at in this designation. The suddenness with which the air passage through the nostrils will become obstructed, and the equal suddenness with which it will be cleared, without the removal of any secretion, might well suggest the idea that some kind of erectile tissue was concerned in this familiar phenomenon. Dr. Bigelow examined the mucous membrane, and detected a spongy tissue with large cells, capable of being rapidly filled with blood and as rapidly emptied, — a structure resembling that of the corpora cavernosa, as the name he gave it implies. This is one of the very few additions to human descriptive anatomy which have been made in this country.

Dr. Bigelow was not a collector of books, nor a great

reader. He opened a book as he would open a jackknife, to use it for some special purpose, which having accomplished, he shut it up and had done with it. I may be allowed to quote my own words, as they stand in the report of the memorial meeting held shortly after his decease by the Boston Society for Medical Improvement: —

“He read men and women as great scholars read books. He took life at first hand, and not filtered through alphabets. He was not ashamed of his want of erudition, and would ask questions on matters with which he was unacquainted with the simplicity of a child. But he would get what he wanted out of a book as dexterously, as neatly, as quickly as a rodent will get the meat of a nut out of its shell. In the address before spoken of, on the use of imagination in science, he handled his rapidly acquired knowledge of the great authors he cited so like an adept in book-lore that one might have thought he was born in an alcove and cradled on a book-shelf. He got what he wanted out of his authority, and the next day the volume he had eviscerated would be kicking about his floor, in the midst of the pamphlets, instruments, and all sorts of learned litter, which half covered his carpet. This power of finding what he wanted in the midst of rubbish he did not want, was hereditary. I remember Dr. James Jackson’s saying to me, that, if there was a grain of wheat in a bushel of chaff, Dr. Jacob Bigelow would find it quicker than any man he ever knew.”

Though Dr. Bigelow was not as much given to general reading as many less occupied professional men, it is not to be supposed that his active mind could fail to find subjects enough to interest it when not absorbed in some important investigation. He had many tastes and fancies which furnished him abundance of pleasant work, and called forth all his enthusiasm, each special pursuit in its turn. To this one object, whatever it might be, he gave himself enthusiastically for the time. When he had mastered all its details, when he had got at all its secrets, he left it for some new and inviting subject.



At one time he undertook the keeping and raising of fancy pigeons. For this purpose he established a columbarium at the top of his house in Chauncy Place, and showed his fan-tails and pouters, and other curious varieties, with great satisfaction, until he had learned their ways and become familiarly acquainted with their various graces and accomplishments. At another time his visitor would be startled by a most unceremonious address from a Myna bird, to which he had taught certain phrases which could not fail to arrest the attention of his visitor. Another of his pets was a little bird which used to run up his sleeve in the most uncanny way. Between these two familiar spirits, he might well have been hanged as a wizard in the days of witchcraft. At another time he amused himself with the study of the ways of ants, placing the sand for their dwelling between two plates of glass, so that their operations could be observed. Again, he found his recreation in the royal handicraft of the locksmith, and studied the intricate contrivances of Bramah and Hobbs as he has studied the arrangements of the hip joint. With this fondness for animal life it is not strange that he held in great aversion the too frequent abuse of vivisection. I have often heard him express himself very strongly on this subject. I think his longest and strongest fancy was for paintings. He did not care to refer to the fact that he was color blind, so far as the difference between red and green was concerned. When he was a boy he could not distinguish between the color of cherries and that of the leaves of the tree. Still, he had a passion for a picture, and spoke with enthusiasm of the color of some that pleased him. A bright patch on an old canvas attracted him in a moment; he would wet his finger and rub off the dust as eagerly as a gold-hunter explores a pebble with shining yellow particles scattered through it. He bought a good many pictures, and it was generally for their color, rather than for any other excellences, so far as my observation has gone. Another of his hobbies, if I may call them so, was the study of agates. He made a large col-



lection of them, and examined some points of their internal formation with great interest.

Dr. Bigelow was not in the habit of speaking of his health, but he suffered at various times from symptoms of different kinds. The earlier pulmonary symptoms which have been referred to do not appear to have troubled him after the period of early manhood.

A few years before his death he was thrown from a vehicle, and received a blow on the head, which was followed by what seemed to be an inflammation of some of the membranes of the brain, leading to what he thought and what proved to be some thickening of the dura mater. His fatal illness seemed to be entirely disconnected with the injury referred to. Occasional passages of gall stones, inflammation of the bile ducts extending to the liver, and producing abscesses, with other marks of internal inflammation, inability to take food without extreme suffering, ended in gradual failure of bodily strength, the mind remaining bright and clear to very near the close of life. It was noted, in examination of the brain, that its convolutions presented an unusual complexity, suggesting a greater amount of vesicular matter than is common.

Dr. Bigelow wrote upon various important subjects of a more general nature. In 1871 he delivered an address upon "Medical Education in America," before the Massachusetts Medical Society. In 1880 he wrote a minority report upon the code of ethics adopted by the Medical Society; and in 1889, an article upon fees in hospitals, in which he took strong ground against certain practices alleged to have grown up in some of these institutions. The last paper on the list of his works is entitled "An Old Portrait of a Surgeon." A painting was presented many years ago to the Society for Medical Improvement, supposed to be a portrait of the great surgeon, Ambroise Paré. The truth of this supposition had been questioned, and remained undecided for thirty or forty years, when Dr. Bigelow thought it was time to settle it authoritatively. For this purpose he insti-

tuted the most searching inquiry; had photographs taken of numerous portraits bearing on the question; carried on a correspondence with experts in Europe; and finally established beyond doubt the fact that the portrait was not of Ambroise Paré, but of another practitioner of a certain reputation, but by no means so great a name as the illustrious surgeon's of whom it had been thought to be a likeness.

Dr. Bigelow was, unquestionably, a man of true genius. Sagacity in divining the truth, the power of continuous, patient, and searching investigation, inexorable determination to have the truth, if nature could be forced to yield it, characterized his powerful intelligence. The record of his printed publications is not a very long one, but it is weighty with original thought and practical discovery. He inherited a distinguished name, and his labors have rendered it memorable and illustrious, — one of the brightest in the annals of American surgery, — not to claim for it a still higher place in the history of the healing art.

Dr. Bigelow was married in 1847 to Susan, daughter of the Hon. William Sturgis. She died on June 9, 1853. One son, William Sturgis Bigelow, survives his parents.

MEMORIAL MEETING OF THE BOSTON SOCIETY  
FOR MEDICAL IMPROVEMENT.<sup>1</sup>

A SPECIAL MEETING of the Society was held in the hall of the Medical Library Association on Wednesday, November 19, 1890. The meeting was opened by the President, Dr. W. L. RICHARDSON, who called Dr. R. M. HODGES to the chair.

Addresses were made by Dr. R. M. Hodges, Dr. O. W. Holmes, Henry Lee, Esq., Professor D. W. Cheever, M. D., and Dr. Hasket Derby. Letters were sent by Professor R. H. Fitz, M.D., and Dr. A. T. Cabot.

Dr. R. M. HODGES, on taking the chair, spoke as follows:—

The death of Professor Henry Jacob Bigelow removes from this community a distinguished and familiar presence, which for more than forty years has enhanced the prestige of the city of Boston, and added a lustre to her institutions of education, benevolence, and art.

The stirring and industrious professional life, which has ended so gradually and serenely, began with all the excitement of sudden and assured success. Two years after the completion of his medical studies in Europe, Dr. Bigelow was made Visiting Surgeon of the Massachusetts General Hospital, and three years later was appointed Professor of Surgery in Harvard University. Fresh from the inspiration of the then novel instruction of Sir James Paget, Dr. Bigelow rose far above the plane of his predecessors as an instructor in scientific surgery, not merely as the result of his aptness in imparting knowledge, but because, in this

<sup>1</sup> Boston Medical and Surgical Journal, November 27, 1890.

part of the world, he was one of the first pioneers, if not absolute leader, in the study of surgical pathology, as well as one of the earliest and profoundest delvers in the mines of elaborate microseopy.

His unequivocal success as a teacher was accentuated by his graphic modes of expression, his felicitous illustrations, his clear perception of essential realities, his self-reliant audacity and indifference to conventional rules, the peculiarity of his abundant humor, and his skill in blackboard drawing. His remarkable manual dexterity was attractive to physicians as well as pupils; but his impromptu lectures in the ward, the accident-room, and the amphitheatre, his definitive rules of procedure in cases of common injury, his lucid explication of diagnostic points, and his reiterated exposition of every detail embodying a principle, illustrated his rare capacity for conveying information and impressing it indelibly on the minds of listeners. It may almost be said that these passing lessons have been of more value to surgeons in this vicinity than even his unrivalled demonstrations of the anatomy of dislocations of the hip joint and fractures of the neck of the thigh-bone, or the most brilliant exhibition of his far-famed operation of litholapaxy.

His career as a surgeon began simultaneously with the discovery of anæsthesia by sulphuric ether. Quick to perceive the magnitude of this discovery, to appreciate its comprehensive value, and to foresee its merciful possibilities, unhesitating when his seniors were timid or jealous, Dr. Bigelow, though then only twenty-seven years of age, took a most decisive and energetic part in securing its admission into use. If he trod the way fearlessly, and, as it seemed to some of his elders, too imperiously, this was because he knew his ground as no other man knew it at that time; and few, even among those who administer or who realize its consolation at the present day, are aware that, without his determination, not only would the adoption of ether have been slow instead of immediate, but that the primary honor of introducing the great discovery would probably have been



diverted from the Massachusetts General Hospital, and from the city of Boston, to some more progressive institution and a more enlightened community.

From its very inception, Dr. Bigelow was an influential and devoted trustee of the Museum of Fine Arts, and his versatile accomplishments have repeatedly lent their aid to its successful administration. He was such an adept in all pursuits engaging the attention of quick-witted men, that it has never been a surprise to find the search-light of his ready brain flashing in some unexpected quarter. Whatever his varied taste led him to take up — whether an unsettled question of surgery, the structure of agates, the habits of a bird or an animal, the intricacies of locks, picture cleaning, photography, or codes of ethics — was pursued with confident enthusiasm, consummate thoroughness, and an exceptional capacity for assimilating knowledge.

His clear conceptions of efficient executive administration, and his suggestive ingenuity, contributed to the smoothness as well as the simplicity of the service in the hospital which he served with so much assiduity and with such distinction during two generations. His fertile mechanical skill promoted the economy of its management by many now indispensable appliances in constant use; and a large number of invaluable instruments of his devising or improvement enrich the exceptionally complete armamentarium of its operating theatre, which was his own generous gift to the Hospital.

Whatever Dr. Bigelow wrote was the embodiment of his own competent opinions, — never a compendium of other men's ideas, or of work which had already been achieved elsewhere. When he spoke at medical assemblages no self-laudatory allusions or exaggeration over-colored either his impromptu talk, or his carefully prepared communications. He possessed the resources of a keen and untiring debater; and nowhere were his force of character, his imperturbable self-possession, his courage in supporting the convictions of his independent, resolute, and far-seeing judgment, more admirably shown than in debate.

No mystification or pretension sullied Dr. Bigelow's work in any department of his profession. No suffering invalid ever found him rough, or thought him brusque. A scrupulous consideration for pain led him to deprecate emphatically, and with recurrent persistence, all unnecessary manipulation of patients, and to advocate earnestly the use of narcotics for euthanasia.

His tenderness toward children was always noticeable; while his gentleness with dumb animals found its complete expression in a strenuous opposition to repetitive, unavailing, or incompetent vivisection.

Everywhere Dr. Bigelow was a genial and most interesting companion. His hospital students invariably felt the magnetism of his picturesque person and manner. They were captivated by his observant power, his marked originality, his stores of learning, and, above all, by his kindly interest in their physical as well as their educational welfare. His great attractiveness, however, to those who knew him best, lay in the activity and clearness of his intellectual faculties, their pliant subservience to his every purpose, and the wide field of thought which his busy mind embraced.

There is an immense satisfaction in recalling the practical side of Dr. Bigelow's character; and no one can look back upon his efforts to simplify surgery — his successful abolition of the "pulleys," the beneficent revolution he wrought in the treatment of calculus, and his part in compelling the immediate and unhesitating adoption of anæsthesia by ether — without a feeling of complacency and pride. But, in honoring the memory of so exceptional a man, the fact which compels our notice is, that, of all his diverse qualities, his wisdom and his genius were the most conspicuous. Above all his other attributes, these won him recognition throughout the civilized world, and have made the name of Henry Jacob Bigelow more familiar than that of any other surgeon of recent times.

It was one of the privileges of Dr. Bigelow's life, which he always spoke of with animated delight, to have been the pupil, the friend, and the colleague, in Hospital and in Medical School, of Dr. Oliver Wendell Holmes. I know their intimate association was one of mutual pleasure, and that no one can speak with better knowledge of Dr. Bigelow than Dr. Holmes, who will now address you.

#### REMARKS OF DR. O. W. HOLMES.

It belongs to the members of the medical profession who have specially devoted themselves to surgery to tell the story of the achievements of one whom all have recognized, and who will be long remembered, as a great master in that branch of the healing art. The name of Henry Jacob Bigelow is identified with two most important innovations in mechanical surgery. It is indissolubly associated with that inventive discovery which has robbed disease of much of its terror, and emancipated womanhood from the legendary curse which has been supposed to perpetuate the wrath of an offended Deity. The story of these triumphs will be told in full by those to whom the record of his life will be committed. A few recollections are all I have to add to your memorial tributes, but they may perhaps shed some side lights on the strongly marked character of our late associate, who was for fifty years my friend, and for a large portion of that time my colleague in the Medical School of our University.

He was a medical student when I first made his acquaintance. He was pursuing his studies in Paris just previous to his taking the degree of Doctor of Medicine in 1841. I had occasion to write to him concerning the existing condition of homœopathy, in which I was interested as an abnormal outgrowth from the medical organism. The zeal with which he entered into the question, the pains he took to learn the most important facts concerning the subject, the intelligence he showed in looking up those facts which would be most useful, and the promptness with which it was all



done, convinced me that he was a young man assured of future distinction. I became more nearly acquainted with him at Hanover, where I was for two years Professor of Anatomy and Physiology in Dartmouth College. He had threatening symptoms of disease while he was living in the hotel where I was staying. He was perfectly cool about the matter, and never lost that natural cheerfulness which often, all through his life, ran into gayety.

If I could, without spoiling the meter, change one word in the line in which Horace describes Achilles, I should be tempted to adapt it, with a large and generous rendering, to the characteristics of this hero of surgery:

“Impiger, *jucundus*, inexorabilis, acer,”

strenuous, good-natured, inexorable to the claims of Nature to keep her secrets from his knowledge, keen in detecting them under their disguises. Of all these words, I like best that hard-sounding expression “inexorable.” That is what the successful student of science must be; for Nature will cheat him if she can with her fallacies; she will bully him if she can with her alleged impossibilities. These were the qualities illustrated by Sir Humphry Davy in that admirable series of analyses which I well remember as described in a lecture of Professor Cooke; the same which we see, perhaps, more wonderfully displayed by Pasteur and Koch in their bacteriological researches. Those who remember Dr. Bigelow’s untiring, unrelenting, keen-scented pursuit of the truth he was after, — the best method of reducing a dislocation of the femur, or of removing a calculus, — will recognize these characteristics. No man knew better than he how “to labor and to wait.” I have seen him day after day, at work with his casts, repeating his experiments, “inexorable” until his work was done, done thoroughly, done once for all, and done with. He showed the same sagacity, method, and perseverance in studying the cavernous arrangement in the mucous membrane of the nares; and again in discovering the true original of the portrait long believed to be that of



Ambroise Paré. He exhausted his subject, — and not till then was it given to the world; and he was ready in due time for his next practical problem. And in the intervals of his work, when his mind was not on it, when he had no plan maturing, no project nursing, never was a livelier companion than this relentless inquisitor of nature. He would for the time forget all about the Y ligament, or the last *écraseur*, and be the Henry Bigelow whom his old playmates remembered.

Dr. Bigelow as an operator is better known to many of you than to me, who hardly ever saw him operate excepting once, when he used the knife on my own person, and did not see him then, because I was under the full influence of ether. To prevent any misapprehension, I will say that the trouble was a slight one, nothing graver than this: there was a little too much of me in one place on one of my arms, in the form of a small fatty tumor which he removed. This was more than twenty years ago, and all that is left of it is a linear cicatrix, — Henry J. Bigelow, his mark. That he was perfectly cool in greater operations, I have always understood. That he was most skilful with his hands I knew, but I do not know enough of his manual adroitness to compare him with his contemporaries, as a rapid and dexterous operator.

Dr. Bigelow sometimes paid me the compliment of asking my opinion of, and my criticism upon, an essay or a lecture he was about to read or publish. On an evening of November, 1846, he called upon me with a paper which he proposed reading the next evening at the regular meeting of the American Academy of Arts and Sciences. He began by telling me that a great discovery had just been made and practically demonstrated in the operating theatre of the Massachusetts General Hospital. He proceeded to read the paper, which was the first formal presentation to the world of the successful use of artificially produced anæsthesia in a capital operation. He had the sagacity to see the far-reaching prospects of the new discovery, the courage as well as the shrewdness to support the claims of the adventurous

dentist's startling, at first almost incredible announcement. Every possible effort was made to dislodge the infant anæsthesia from its cradle in the Massachusetts Hospital, but there remains the fact that all over the wide world patients were shrieking under the surgeon's knife and saw, — operator and victim alike ignorant of the relief in store for them at the very time when Dr. Bigelow was unfolding in my library the first paper ever written on the subject, and saying to me as he did so, that within a fortnight the news of the discovery would be all over Europe. From the first, Dr. Bigelow was the steady, unflinching advocate of ether as the safest of the anæsthetics, and his views, though not universally accepted, have had a very wide and lasting influence.

To have been largely instrumental in making the inestimable gift of anæsthesia to mankind, to have corrected the teachings and reformed the treatment of Sir Astley Cooper in the most formidable of dislocations, to have won from Sir Henry Thompson a frank acknowledgment of the superiority of his American rival's treatment of one of the most distressing maladies, — all this makes up a professional record almost, if not quite, without a parallel in the history of American surgery. If the highest claim is questioned, I can only think of the name of McDowell, and possibly one other, as disputing it, and I must leave the question to the experts who are competent to decide it.

Dr. Bigelow was not a man of erudition. He read men and women as many scholars read books. He took life at first hand, and not filtered through alphabets. He was not ashamed of his want of book learning, and would ask questions on matters with which he was unacquainted with the simplicity of a child. But he would get what he wanted out of a book as dexterously, as neatly, as quickly, as a rodent will get the meat of a nut out of its shell. I remember an address of his delivered some thirty years ago, in which he insisted very justly and philosophically on the importance of imagination to the man of science. I think it was in that

address, which I ought to have by me to refer to, that he handled his rapidly acquired knowledge of the great authors he cited so like an adept in book-lore that one might have thought he was born in an alcove and cradled on a book-shelf. He got what he wanted out of his authority, and the next day the volume he had eviscerated would be kicking about his floor in the midst of the pamphlets and instruments, and all sorts of learned litter, which was commonly to be found variegating the pattern of his carpet. This power of finding what he wanted in the midst of rubbish he did not want, was hereditary. I remember Dr. James Jackson's saying to me that, if there was a grain of wheat in a bushel of chaff, Dr. Jacob Bigelow would find it quicker than any man he ever knew.

Dr. Henry Bigelow's active mind found various employment outside of his profession. At one time he had a fancy for raising pigeons, and kept a columbarium at the top of his house in Chauncy Place. He did not like doing things by halves, so he sent and obtained the prize pigeons from one of the great London shows. He was very fond of pictures, and would rub the dust from an old canvas with his wet finger, and go into ecstasies over a bright bit of pigment, though he was reported to be color blind, about which statement I never remembered to ask him. His last fancy was the beautiful one of creating a fine country place in a spot which he had selected in the town of Newton. There I last saw him, not really well, but not complaining, planting the young trees under the shade of which he was not to sit, looking with delight on the far-off mountains which bounded his landscape; and then I hoped I might see him, if a few more years were left me, enjoying a serene old age in the consciousness of having done noble service in the cause of science and for the good of his fellow men. But the trees are still growing, Monadnock and Wachusett are looking down upon the home he created, and he is gone.

Most of you are familiar with his fine, manly figure, his intellectual head, a dome which the insolent Schopenhauer



would have allowed might well be the seat of lofty endowment,—with his pleasant features and his agreeable voice and manner. He was not especially fluent in speech, but could put what he wanted to express into as few words—I was going to say, as his father could, but that is a great deal to claim for any man, even if that man was his own son. He had no great facility in writing, but what he wrote was solid with his thought. When he was deeply in earnest, he had a particular movement by which I could always tell that the powerful brain was at work, as well as I knew that the steam was up in the boiler of an engine when I saw the walking-beam in motion. Some of you must remember that flexing and extending of the right forearm,—that always meant there was lively action going on in that capacious and vigorous mental engine-room.

Dr. Bigelow remains with us in memory as a striking picture, a master in his calling, a man to be admired by the many, and to whom the few who were admitted to his intimacy were sincerely attached. I trust that some fitting record of one whom, now that he is gone, it is not flattery to call illustrious, will be added to our American Medical Biography, of which it will form one of the noblest chapters.

DR. HODGES:—Dr. Bigelow was emphatically a Bostonian. He was the companion from boyhood until his life's end of Mr. Henry Lee, who will find it a grateful task to recount some of the impressions left by his versatile friend as they grew up and lived together for many years in the city to which both were so much attached.

#### REMARKS OF MR. HENRY LEE.

If Dr. Bigelow were alive, he and I might furnish entertainment for you by provoking reminiscences from each other, and dwelling humorously upon each other's peculiarities and misadventures; but now that his voice is hushed, I am in danger of drawing a one-sided sketch when not cor-



rected by his criticisms. Even if I succeed in setting before you fairly the image of my old playfellow, it will be but the image of the boy, in whom were latent the traits and talents which in mature life "marked him extraordinary, not in the roll of common men."

When I was just turned of three years, my father moved from a pleasant old garden house, which stood where now frowns the portico of the Tremont House, to one of those cosey little courts which were favorite retreats for families living on intimate terms with each other and a little aloof from the great world. On one side of Bedford Place, for so was the court named, was the house and garden of my uncle, Judge Jackson, then august, though only forty-five years old. On the other side all six houses were owned and occupied by our family and near of kin. Close by, in Summer Street, in the houses belonging to the First Church, dwelt my cousin George Cabot and Henry Bigelow.

From that time until we separated for college, we formed an inseparable trio, to the great complacency of George's mother and aunt; for he was a very handsome boy, — with red cheeks, brown eyes and hair, and a goodly figure, — and we two pale, slender white-haired boys set him off to advantage. We played together not only the usual recurring games, but also a few tricks of our own inventing, the remembrance of which amuses me more than the narrative would entertain you.

While in our walks into the country for birds or flowers, or at plain carpenter's work, I could beat Bigelow; on the other hand, swimming, or dancing, or at the gymnasium, — wherever agility was needed, — he was immeasurably my superior.

During our college life we roomed off the same entry in Hollis two years, and he inherited my room at my graduation. Circumstances — we were both busily occupied, and beside he voyaged for health, I for business — separated us for a few years; then we came together again in Paris, and afterwards, until marriage and business engrossments parted us.

You want to know what traits I observed in these years of youth and boyhood. In the first place, he had a pleasant temper, or I should not have clung to him all these years. I say clung to him, for, while we clung to each other, I was rather more dependent than he, and that may have been true of all his companionships. Then he was a most entertaining companion, not only because of his keen observation of men and things, but also as well because of his eccentricities;—his intermittent activity and repose; his relentless, exhaustive unravelling of some tangled skein, or eager pursuit and abrupt abandonment of one hobby after another; his absorption in all he was doing, and consequent absent-mindedness; his intense curiosity about matters, some intrinsically interesting, some uninteresting; his secretiveness, or to say the least, excessive wariness. These traits combined to make the Doctor, as I early named him, a source of constant amusement to me and all his associates. We two were friends upon the principle of "like likes unlike." We were complementary to each other; I saw the outside, he the inside; I was an observer of persons, he of things. He was quite unobservant of his surroundings; took little notice of scenery or of wayfarers. While he studied the movements of a clock at a shop window, I, incapable of that achievement, had memorized the passers by. So we jogged along, each refreshed by the other's differences.

When I was a young man, all our physicians were general practitioners; now, you are all specialists. As I gaze around, I behold the faces of those who have exercised their skill on my eyes, my nose, my ears, my skin, my stomach. Well, this is evolution; you are all by nature, as well as by profession, specialists; and my old friend and playmate was eminently a specialist, — morally and mentally a specialist. He was like a man looking through a spy-glass, who sees all within the field of vision more clearly than his neighbors not so provided, so that he was able to discover and analyze details invisible to them; and the world has

profited and will continue to profit by his discernment and analysis. He was like a locomotive which surpasses other vehicles in power and speed, but is confined to its track. One cannot look for inconsistent advantages; you cannot expect a man with a glass to see what is without his field of vision, unless he and his spy-glass are both afflicted with diverging strabismus. The locomotive will haul you and your goods far and fast, but only while it keeps on its track; it is no respecter of objects thereon, either animate or inanimate; strollers must heed the warning, "Look out for the engine."

"Time is short and art is long"; and the man who, by concentrating his mind upon some intricate problem achieves its solution, and thereby saves his fellow men through all time from suffering hitherto unrelieved, must be ranked high, not only in the list of great discoverers, but also in the ranks of benefactors of mankind. Had he not been so occupied, he might have adorned society; he might have taken an active part in public enterprises and charities of the time; he might have been more mindful of the joys and sorrows of those among whom he had been born and bred, more surrounded by friends; and when called away, he might have been missed from more circles; but he could not, in all probability, have invented and transmitted these great alleviations to his fellow men.

Connected with this brilliancy of intellect, this shrewd discovery of the one grain of wheat in the bushel of chaff, this successful solution of mechanical difficulties which had baffled all previous essayers, — connected with, and no doubt consequent upon these evidences of superiority, and consequent also upon his isolation, there came to him a natural enough presumption of superiority in other fields which he had never traversed, and where others had been hard at work, urged by motives which did not appeal to his nature. Here, beyond his rightful domain, he displayed both presumption and incredulity, — incredulity as to the possibility of mainsprings which were not to be found in his machinery,



and presumption of superiority in all directions, based upon his acknowledged superiority in many directions. This was a natural error of judgment; but it was an error sometimes of great consequence. This is why I said that, with all his genius, with all his accomplishments, he was morally and mentally a specialist.

There were two lovable traits which endeared Dr. Bigelow to all his patients, simple and gentle, — his untiring devotion and his reluctance to give pain. On this latter point I can add my testimony to that of more suffering martyrs.

I accepted this invitation very reluctantly, anticipating what I now realize, how imperfect, and therefore how unfair, would be my sketch of my old friend. To me, up to our last meeting, he was always the old bosom friend of my boyhood and early manhood, reviving remembrances of the joys and griefs, the work and play, the frolics and rogueries and escapades of those days, which while we talked came back to us as vividly as yesterday.

I close with a few words which, as President of the Association of Alumni, I had put together as a fitting introduction of Dr. Bigelow, who had been made Emeritus Professor of Surgery in the Harvard Medical School. As the Doctor declined to appear, they were never spoken.

“Old Dr. James Jackson, long the Nestor of his profession in Massachusetts, speaking of one of his pupils, then risen to eminence as a physician, a botanist and technologist, described him as one who would find a grain of wheat in a bushel of chaff.

“While we do not here inherit titles, we do inherit talents from our fathers, and the son of this remarkable father has risen to great eminence as a surgeon and a professor, as might have been safely predicted by any of his schoolboy and college comrades, whatever profession he had selected. This eminence has been recognized by his Alma Mater this day.

“Yet there is reason to fear that our Emeritus Professor of Surgery has, by his two great operations upon the stone



and upon the hip joint, incurred the anathema of our great Shakespeare, who thus imprecates such meddlers:

‘Blest be the man that spares these stones,  
And cursed be he that moves my bones.’”

DR. HODGES:—For thirty-three years Dr. Bigelow was Professor of Surgery in the Medical School of Harvard University. This long service must have left its indelible impress. The walls even of the room in which he lectured cannot but have their *transmittendum*. No one can tell us better of the inspiration which still lingers about the Chair of Surgery than its present incumbent, Professor David W. Cheever.

#### REMARKS OF PROFESSOR D. W. CHEEVER.

This remarkable man was of Latin, rather than Anglo-Saxon type. The logic of the French, the will of the Roman, the subtlety of the Italian, were united in an intelligence which leaped to conclusions with the accuracy of genius.

As a surgeon, in method he was a pupil of the French school. To ingenuity he added dexterity, and to dexterity grace. He was alert, cool, practised; whenever he appeared on the operating arena it was as a central figure. Precise in touch, supple in movement, he added the polish of the finished artist to the nonchalance of the experienced operator. To see him operate was to recognize a master.

He was a discoverer and an inventor. He discovered the mechanism of the ilio-femoral ligament, and he utilized its fibres in reducing dislocations. He discovered the tolerance of the bladder, and he invented the lithotrites and evacuators which this tolerance of nature patiently endured.

He was a promoter of a new discovery in anæsthesia, and the champion of its discoverer.

Though eminently persistent and thorough in details which he regarded as essential, he was impatient of anything which seemed to him needless routine; and he fortunately lived at a time when he was spared the intolerable slowness of antiseptic surgery.

His active mind often devised new mechanical combinations for unexpected cases.

He would have excelled as a leader in government, or diplomacy.

He was long in service as a Professor. A terse, clear, and epigrammatic teacher, he possessed peculiar powers in extracting the wheat from the chaff of learning.

He was conservative; he refused to be moved by the times; he was opposed at first to changes in medical education, because he believed that the average community required only an average doctor, and that the average doctor needed only an average knowledge; while the exceptional man would acquire higher knowledge of himself.

Expert in surgical pathology, dominant in the field of operation, and clear and logical in diagnosis, his death is a loss to surgery. His genius must always command our admiration, as his discoveries modify our art.

DR. HODGES:—Of the many hundreds of students who have sat at Dr. Bigelow's feet, none remember him more vividly or gratefully than his hospital house officers. The charm of the relationship has never been forgotten. Dr. Hasket Derby, his house surgeon in 1858-59, still holds that year in happy remembrance for its association with Dr. Bigelow.

#### REMARKS OF DR. HASKET DERBY.

You have listened to the words of the associates, the colleagues, and the intimate friends of Dr. Bigelow. It is my privilege to speak as one of his pupils, his assistants, and last, but not least, as one of the recipients of his singular and unmerited kindness. With his commanding talent as a surgeon, and his ability as a teacher, all present are familiar. But there was a side to his character comparatively unknown to the world at large, and fully appreciated only by those younger members of the profession whose good fortune it had been to find in him not only a wise

and honored instructor, but an ever interested and sympathizing friend.

No one who has passed a year at the Massachusetts General Hospital as Dr. Bigelow's house surgeon can ever fail to recognize the effect of the time thus spent on his subsequent career. His subtle influence on his students was felt the more for being exerted so insensibly. He was the one surgeon who apparently devolved on his assistant the responsibility of everything connected with the patient except the choice and performance of the operation. The head of a young man might well be turned by the confidence that seemed to be placed in his ability. But all that went on was keenly, if silently observed; and the tyro whose diligence was found to slacken, or whose conceit led him to suppose that he might vary ever so slightly from the proper path, would unexpectedly discover his mistake. The lesson thus given was never forgotten. But the diligent and faithful student had nothing to fear. His unavoidable shortcomings would be forgiven, and his earnest efforts rewarded with the bright smile or the single word that, from such a master, was worth many a set speech of dull laudation. Yet the faculties had to be ever on the alert, and the senses always sharpened. At the old Medical College the Professor of those days took the long, straight flight of stairs leading to the upper lecture-room in single instalments, and ascended with grave deliberation. Dr. Bigelow, always hastening from the hospital to his class, cleared three steps at a bound, and his assistant well knew that he too was not to dally on the way. He had need of all his strength, mental as well as physical, to follow the master he served.

The hospital term completed, the year that makes an impression on the education and character of the student never to be effaced, and the examination for the degree passed, the relation of teacher and pupil, of surgeon and assistant, terminated, and the young physician hastened to complete his studies at the great European universities and clinics. After a lapse of several years, and having per-



haps in the mean time sought to prepare himself for the practice of some special department of medicine, he would return to America and endeavor to establish himself in his native city. Who has not realized the depression felt at the outset of his career, consequent on the change from the bustle and activity of the schools, from the days and nights spent in absorbing study, from the unrivalled opportunities for observation and investigation, to the deadly quiet of the first office and the weary wait for patients? Happy the man who goes through this ordeal unseathed, happier still he for whom it is shortened, or even abrogated, by the intervention of a friend like Dr. Bigelow, who would follow with unfailing interest his former student on his first settlement at home, unobtrusively tender advice, the golden fruit of his own experience, offer opportunities so rare and seemingly so natural that their carefully hidden source would scarcely be inquired into, and send ease after ease from his own clientele, month after month and year after year, until the beginner found himself suddenly transported from the bottom to the top of the ladder, and in possession of a practice the amount and material of which he could hardly have dreamed of acquiring after years of patient waiting. No allusion would ever be made as to the source of this success, no gratitude claimed, and no thanks allowed. This is what Dr. Bigelow did for students who, after an absence of years, might hardly dare to hope themselves remembered by their honored master. The kindness that prompted it was a hidden trait in his character, and one of which only the few that best knew him were fully aware.

It seems but the other day, although now more than thirty years have gone by, since he came forward in the old room of this Society in Temple Place, and uttered his official eulogy on Dr. John C. Warren, then just deceased. I remember well the words with which he closed, alluding as he did to the passing away of such men, ripe in years and honors, "Their works do follow them." It shall not, in his own case, be the fault of those whom he so disinter-



estedly befriended and assisted, that these works are not known of men.

The following resolutions were reported by DR. R. M. HODGES, and adopted by the Society:—

“*Resolved*, That the Boston Society for Medical Improvement desires to record its sense of the loss sustained in the death of its most distinguished member, HENRY JACOB BIGELOW. Possessed of unusual surgical perception, quick insight, great technical skill and dexterity, clearness and directness as a teacher and writer, he added to these the qualities of leadership, an unusual intelligence, and an indomitable persistency in whatever investigations he undertook. His achievements have won for him a place among the foremost surgeons of his time, and his works have benefited humanity.

“*Resolved*, That a copy of this record be sent to the family of Dr. Bigelow, and to the ‘Boston Medical and Surgical Journal.’”

## BIGELOW AS A SURGEON.

BY A. T. CABOT, M. D.<sup>1</sup>

EMERSON says, "Intellect lies behind genius, which is intellect constructive." And rarely has an intellect so constructive as that of Henry Jacob Bigelow applied itself to the problems of surgery.

He did not devote himself to the enlarging of fields already occupied, and partly tilled by predecessors, but rather to the work of a pioneer, opening up unsuspected ways into regions not explored.

His mind, thoroughly intellectual, had a wonderful power of insight; and when it applied itself to the investigation of a subject, it was rare that its search after truth was in vain. No more striking illustration of this could be found than in his work on the hip. Until he turned his attention to the study of hip dislocations it was only known that the most powerful traction, in what seemed to be the right direction, often failed to draw the bone into place, while occasionally manipulations by rotating and pulling the limb in a more or less aimless way accomplished a reduction with a comparatively slight exercise of force. It remained for him to penetrate the mechanical mysteries of this joint, to discover the action of the Y ligament in shaping the deformity, and to show how this band of fibres, which had so often frustrated the most violent efforts of the surgeon, could, when rightly understood, be made to assist in the reduction, and to guide the bone back into the socket. The subject remains where he left it.

It should not be supposed, however, that this great intelligence supplied the place of work; for Dr. Bigelow was an indefatigable worker, and, when pursuing an investigation

<sup>1</sup> Boston Medical and Surgical Journal, November 27, 1890.

in which he was interested, he never spared himself, and left no corner unexplored. If the thing sought was a perfect lithotrite, he was ready to spend days in the workshop watching every detail as it went through the maker's hands, and accepting nothing as finished until he could detect no possibility of further improvement.

Those who were familiar with his back office could form some idea of the work that he put into the perfection of the "Simplified Evacuator" from the piles of rejected models that covered the floors and tables. Every detail of his litholapaxy apparatus was thus carefully elaborated, and tested as to its working capacity at every stage in its development, and to one looking on it might truly seem that "genius is an infinite capacity for taking pains."

While undoubtedly it will be his work on the hip and litholapaxy which will be longest remembered in connection with his name, we should not forget his share in helping on the cause of surgical anæsthesia: "The greatest single step forward in the history of medicine." He not only aided and abetted Morton in his experiments with ether inhalation, but his papers on the subject gave it at once a firm footing in surgical practice, and hastened its adoption throughout the world. His own well known dislike of giving pain must have often caused him to look back upon his share in annulling surgical suffering with peculiar pleasure.

Besides these signal achievements which place the name of Henry Jacob Bigelow in the roster of the great in surgery, there were many other contributions that he made, which, though of less importance, would have been sufficient to make the reputation of a lesser man.

His discovery of the erectile character of portions of the nasal mucous membrane, his operations for exstrophy of the bladder and for ununited fractures, are evidences of his acute observation and constant interest in all branches of surgery, and the best operating chair, the best autopsy table, and the best urethral divulsor now in use all attest his mechanical ingenuity.

As a lecturer he was very clear in statement and happy in illustration. He placed the subject under discussion vividly before his hearers, and showed remarkable judgment in forbearing to cloud the clear outlines of its important features with too much detail.

The impress of Dr. Bigelow's teaching is still widely felt throughout this community, and many a man to-day dealing with surgical difficulties is helped safely through by the recollection of some apothegm of his old Professor, in which the pith of the subject was served up in a form so compact that its very dryness made it attractive and easily preserved in the memory.

Who, of his old scholars who has an injury of the elbow to treat, does not remember that he must go through the motions of reducing a backward dislocation of the joint, and must put the arm on an internal angular splint in every case except when he can clearly make out an uncomplicated fracture of the olecranon; and in how many cases of imperfect diagnosis have stiff joints been saved by the remembrance and practice of that rule?

To those who came in close contact with him as his house surgeons, he may have sometimes seemed exacting, for he usually had several investigations in hand, and when interested in the pursuit of facts he spared others as little as himself. This was compensated for, however, by the advantages they had in personal instruction. He taught them surgical principles, and often left them to apply these to the patients; but if an assistant became slack, or a case was not going well, the fact never escaped his keen eye, and a few words on the duties of internes, or a practical talk on the application of surgical principles to that particular case, was the result. Under this practice the men learned surgery and self-reliance, and the patients did well.

To the sick he was kind and sympathetic, not patient to listen to useless tales of woe, but keenly alive to present suffering.

He early found that his strength was not great, and that



he must husband his resources; and he sacrificed much of his private practice to the urgent need for time to devote to his teaching and original researches.

He was a brilliant operator, bold and keen, full of expedient, going direct to the object sought with no fumbling of mind or hand. To see him perform litholapaxy was a liberal education in that branch of surgery.

Such is a brief outline of some of the characteristics of the leader we have lost. Quality, not quantity, he strove after in the work he gave to the world; and for that quality will it endure.

## HENRY JACOB BIGELOW, M. D.

A TRIBUTE OF RESPECT INSPIRED BY AFFECTION,  
ADMIRATION, AND OBLIGATION.

BY REGINALD H. FITZ, M. D.<sup>1</sup>

THE brilliant achievements of the late Henry Jacob Bigelow in the art of surgery may obscure in the minds of many, especially those of a younger generation, his contributions to medicine in general, and his interest in medical science.

He was the first to announce to the world the discovery of modern anæsthesia. For a year or two after this discovery, it was he who administered most of the ether used at the Massachusetts General Hospital. As the result of this experience, he first clearly showed its advantages, dangers, and the precautions to be taken in its use. Of him, in this relation, it was said by the late Dr. Edward H. Clarke: "He did more than any other living person to bring it before the medical public of this country and of Europe, to assert its real value, and to point out the best methods of utilizing it." How much more even than all this he may have done in the matter is, as yet, unwritten history. To have been thus identified with the greatest blessing ever discovered for mankind was his fortune and desert before he had been two years in practice.

The period in Dr. Bigelow's life which has a particular interest for me is that first developmental decade, when what he was to accomplish was unknown; what he was capable of doing must have been anticipated. That he was the most gifted and brilliant young man among his coevals there can be no doubt. We all know what his maturer years accomplished. We want to know the sentiments which inspired the

<sup>1</sup> Boston Medical and Surgical Journal, November 27, 1890.

earlier years of his professional life, and which served as the basis of the superstructure which rose to so great a height. It is for his contemporaries, now so few, to give this information from their point of view. Fortunately for us, his own writings at that time, though also few, give decided assistance.

At the age of twenty-three Dr. Bigelow received the Harvard medical degree, and spent the subsequent three years in Europe, chiefly in Paris. Two years after his return he was appointed one of the surgeons of the Massachusetts General Hospital, and at the age of thirty-one he became Professor of Surgery and Clinical Surgery in the Harvard Medical School.

At the height of his professional activity surgery to him was eminently utilitarian. However much he might admire science in the abstract, it was his chief work to investigate problems the solution of which would add to the physical welfare of mankind. His career at this early day was distinctly scientific. The knowledge he was acquiring had no apparent immediate application to the art of medicine, but it served to develop his intellect, and he fully realized the importance it bore in fitting him for his subsequent life. It is possible at this time he may not have known whether his footsteps were to follow those of Hunter, or those of Sir Astley Cooper, whose career his own perhaps more closely resembles than that of the other eminent surgeons of history.

He returned from Paris at a time when the influence and teachings of Louis were paramount. The advocates of the so called numerical method of studying medical problems were crying from the house-tops. In 1846, as President of the Boylston Medical Society, he made an address which was entitled "Fragments of Medical Science and Art." It was an appeal for the use of the inductive method in medicine, and advocated the exercise of the imagination for the promotion of medical discoveries. It indicated the reaction of his own mind against what seemed to him the mere accumulation of duplicate facts. New facts were what he desired, and more of them. These were to be found by chemical reagents, the microscope, and other means of physical examination. We

are thus not surprised to learn that in his earlier years he served as a teacher of chemistry, and became an expert in the use of the microscope.

It is through his devotion to pathological anatomy at this period that one of the monuments of his industry remains, — unfortunately as fragments, but of such a size and character as to suggest the structure in contemplation.

He sought for and secured whatever pathological material bore upon surgical diseases. He took it to a laboratory which he had founded and furnished, and in which was an artist trained and employed by himself. Colored drawings were made of the gross appearances, and the results of his microscopical and micro-chemical examinations were drawn and described with the utmost detail. Years were spent in this work. The art of the lithographer was called upon to reproduce these drawings in a more permanent form, that they might serve as plates for a volume on surgical pathology. While in the midst of this work the "Atlas of Pathological Anatomy," by Lebert, made its appearance. Dr. Bigelow saw that his task was done by another, even on a larger scale than he had contemplated. His plan of publishing an illustrated Surgical Pathology was thus completed. What the illustrations would have been is, in part, known to the generations of Dr. Bigelow's students who have admired in their turn the magnificent diagrams with which he illustrated his lectures on surgery. The beauty of some of these pictures is so conspicuous, in virtue of color and outline, that one forgets the repulsive nature of the object, and simply admires the skill of the artist. No one gave the latter more credit than did Dr. Bigelow. Within a few months, when he gave this collection to the Harvard Medical School, he stipulated that each should bear the name of the artist, which has been indelibly impressed upon them. The original drawings are those which possess the highest artistic merit, but those reproduced from various other sources are often interesting. Among them is an enlarged copy of an illustration from Addison's paper, showing the emigration of the white blood corpuscles, the



rediscovery of which, many years later, has made the name of Cohnheim imperishable. That Dr. Bigelow should have sufficiently appreciated the importance of this observation to have made it the object of illustration in his lectures, forty years ago, is truly noteworthy.

It is interesting to see how Dr. Bigelow described the anatomical and histological appearances which he saw. In his "Notes from Clinical Lectures on Surgery" (1851), he speaks thus of cancer of the lip: "But in its early stage the epithelial disease of the lip generally shows upon section as, in this case, a dense, white, opaque color, and often upon minute examination, as here, vertical striæ dividing it into apparent columns, which either terminate at the free labial edge, disintegrating into a paste which furnishes a scab, or may rise above it to a considerable height. But the microscope leaves no doubt in the majority of cases. I will not say all cases; for though some observers have no question upon this point, I have not satisfied myself about it. In most cases the field, as in the present instance, shows unequivocal epithelial features. The white caseous mass shows the normal epithelial cells and scales, every irregularity of the latter varying in size and shape; while the distorted cells often attain, with and without nuclei, enormous size. A careful observation also detects little groups of the minute cells in the first period of their growth."

In the same pamphlet are contained the following statements concerning certain superficial cysts:—

"By 'encysted tumors' I mean a distinct bag or cyst, containing this peculiar caseous, soft, white material. Serous cysts, if we except 'hydrocele of the neck,' are excessively rare; cysts containing glairy fluid, if we except the bursæ, still more so. Nor should the term 'encysted' be applied to those hard or fatty tumors which happen to get surrounded by a little condensed cellular tissue, from which they 'peel out.' The true 'encysted tumor' is very common, and, being quite distinct from other growths, should have a monopoly of the name. It is said to contain either *atheroma* or *meliceris*,

very ancient words, which often convey no distinct idea. Yet these terms are really very descriptive of the two varieties of the contents: the former signifies *pap*, the latter *honey-wax*; by which is meant, I believe, not clear honey, but chilled or frozen honey, which it greatly resembles. They are in pathology nearly identical; but *atheroma* readily mingles with water; *meliceris* is waxy, sebaceous or oily, and sheds water. *Atheroma* is a watery fluid, filled with little plates or fragments of epidermic material, sometimes as large as grains of rice, and of a semi-translucent white. Under the microscope this shows numberless epithelial scales, of which these masses are composed, sometimes nucleated, sometimes not, and often very irregular. In *meliceris*, on the other hand, though there may be serum present in small quantity, yet the cells adhere to one another by a tenacious sebaceous matter or concrete oil, and at least in four among the tumors of this sort which I have removed, and of which I have retained a careful microscopic record, there were no scales, but in their stead beautiful translucent oval cells, a few of them nucleated; and occasionally, as a few in this case did, presenting irregularities in form, and some being of minute size. Their usual diameter is rather less than that of an epithelial scale, and they are seen embedded in and inseparable from the granular, sebaceous, oily mass, when the field is filled with water; but substitute oil for the water between the glasses, and these granules are at once dissolved, the cells coming out clear and clean into the field, and being the most truly beautiful cells I have ever met with among morbid growths. They are almost hyaline, and may be rolled about like little bladders. In one case they partially collapsed upon the contact of oil, as by an instantaneous exosmose. The gross mass looks like lard at ordinary temperatures, and is sticky and greasy to the touch.

“The cyst of *meliceris* and *atheroma* is sometimes lined with a beautiful epithelium. Sometimes the epithelium is irregular and rough. In two cases, at least, of *meliceris*, the epithelial lining was only partial, the rest of the surface

being moist and divested of integument. This last character may, perhaps, have some influence in determining the quality of the secretion; whether watery, or sebaceous and waxy; whether epithelial scales, or those large and beautiful epithelial cells. . . .

“Of their cause we know nothing. Astley Cooper thought that they were obstructed, sebaceous follicles. Lebert states that they contain all the products of these follicles. This they certainly do, and, in addition, often hair, free and attached; but they are often deep, and seem to me to have also other analogies than those offered by the sebaceous follicle.”

The search for knowledge of the above sort was something more than utilitarian, but Dr. Bigelow never regretted the time spent in the pursuit. It was a pleasure to him in later years to call attention to his scientific work of this period, and to point out in his diagrams the observations then made.

Throughout his professional life he was accustomed to emphasize the importance of the study of pathological changes. In his address on “Medical Education in America” (1871), he says, “No single branch of education is more essential to the medical student than pathological anatomy, the corner stone of medicine.”

His own contributions in this direction were made at the beginning of that progress which none knew better than he was to result from a more minute knowledge of facts; such as hitherto were not even to be imagined, but which were to be discovered by the use of finer and more searching methods of observation than those previously known and cultivated.

In precept, as well as example, he advocated that scientific acquirement should be the only standard of professional opinion. In his introductory lecture of 1849 he thus disposes of the *tactus eruditus*: “A skilful surgeon detects fluid, not because his tactile papillæ are more sensitive, but because his ready knowledge furnishes him with natural groups of symptoms, which now exaggerate and now discountenance the value he would attach to the indications of the tactile sense.”



And in his address, in 1859, on "Science and Success," we find one of those gems that often sparkle in his essays: "No quality is more essential to sound medical practice than sound judgment, . . . an enlightened judgment is as necessary as an informed conscience."

The first decade of Dr. Bigelow's life now came to an end, and with it the opportunities for devotion to more purely scientific research. The demand for his services in the practice of the healing art became greater and greater as the years rolled on. Others could accomplish the work which first interested him; he alone could fill the gap which lay before suffering humanity, and which, through his labors, has been freed from some of its terrors.

The main object of his subsequent medical life was usefulness, — usefulness not only to his immediate surroundings, but to all mankind. He said, "Utility does not demand great intellect, . . . the prizes fall to industry; and sometimes to a tenacious, I had almost said insane, pursuit by each of his own chimera." But in this pursuit of the useful he made two of the most important discoveries of his life, the significance of the Y ligament in hip dislocation and the tolerance of the bladder to prolonged operations.

These were the years in which his wisdom was so conspicuous. As physician or surgeon, as medico-legal expert, in the daily affairs of life he was *facile princeps*. The difficulties which surrounded the beginner faded away as his advice was taken. A complicated code of ethics became, in his hands, simple, sensible rules of life, an adherence to which enabled the follower to avoid the pitfalls and surmount the obstacles placed in his way by ignorance or design.

His wisdom was based upon a profound insight into and a knowledge of character which led him to anticipate action and to control it. This wisdom, this knowledge of human nature, enabled him to rule men by showing them what they might accomplish. The delicacy of his tact made it easy for him to turn aside opposition from the one quarter, while the vigor of his intellect and the power of his arguments would



cause other opponents to yield, even if not convinced. It was his first task to see the objections which might be presented, and, in seeing them, to discover the appropriate control. He was a master of details, and allowed nothing essential to escape his grasp; with a remarkable power of condensing, he retained the latter and set aside the rest. His wisdom might seem conservative to those who sought for change, but it was based upon an enlightened experience. He was always willing, in virtue of the imaginative qualities he so urgently commended, to make new trials. But these trials must not be so rash or so chimerical as to promise failure or to hazard an existing good.

A conspicuous instance of the exercise of this wisdom is to be found in his advice to make haste slowly when radical changes were contemplated in the system of education at the Harvard Medical School. His views were presented in an address under the title, "Medical Education in America," delivered before the Massachusetts Medical Society in 1871. As might be supposed, they were eminently practical.

Since a medical school was a place for the education of practitioners of medicine, it was important, first, that it should give "a plain, sound, solid education, without error, if without ornament." It might then, if able, meet the demand for a higher education. It should give "the highest average development of which the man is capable in the three years of study." At the same time, "it would be desirable to raise the average level of medical acquirement, skill, and capacity, the world over. . . . But the standard of medical education should be raised gradually, and with certainty, by making the best of opportunities available to the largest number." Since, "of two classes educated to the same standard in the same community, the larger will yield the greater product of wheat as well as of chaff," any reform in medical education in this country should aim at educating at least an equal number of students to a higher standard. The student of average preliminary training and acquirement, after three years of honest devotion to medical study, should possess "a knowledge at

once adequate to the immediate practice of his profession, and a germ of future growth in the right direction, — knowledge unmistakably medical, practical, comprehensive, and rooted in the soil of modern science.”

In devising a plan to raise this standard, he agreed with Huxley in preferring regulations which would open to the medical student a most liberal scientific opportunity, and insist upon a competency strictly medical. He did not agree with the details of the plan drawn by his colleagues, since, in his opinion, too much stress was laid by them upon the less applicable sciences, instead of giving more time to the study of medical science, especially to medical art. He anticipated that such a plan would result in a diminished attendance and diminished receipts; the immediate usefulness of the School would be impaired in accordance with the loss of numbers, and its life might be imperilled. He was ready to raise the standard of medical education, but preferred to do so gradually and with certainty, giving the best opportunities to the largest number.

Although the plan adopted by his colleagues resulted in a diminution of the number of students, the finances of the school were rather improved by the adoption of better methods of conducting the business of education. This diminution in the number of students and the increased cost of educating them are, perhaps, causes of an increased influx of medical graduates of other institutions, whose standard is less high, into the towns of Massachusetts and other parts of New England.

Dr. Bigelow's objections to the teaching of a disproportionate amount of less applicable knowledge are now being advocated by some of those who were then his most vigorous opponents. They complain that enough, perhaps too much, has been done for the development of laboratory teaching in the scientific branches of medical study, and too little to foster and promote increased facilities for clinical instruction.

Dr. Bigelow, as I knew him, was a wise man, of brilliant talents, and of great energy and power. Accepting a favorite

definition of his own, he was a genius. For "genius is talent with a marked taste to direct, and a strong driving power to work it." His qualities appealed rather to the head than to the heart, but he was not accustomed to wear the latter organ upon his sleeve. He kept his own counsel. Those in whom he was interested, and in whom he trusted, found him loyal in the extreme, ever ready to aid and encourage by word and deed, with all his might if needed. He asked no thanks, nor sought gratuitous service. He read character so unerringly as rarely to be mistaken in his judgments of men. Whatever he undertook to do by himself, he usually accomplished. His charm of manner, the depth of his knowledge, his sense of humor and keenness of wit, made it a privilege to be in his company. How great that privilege was, is first fully realized when it is no longer possible. He died like a philosopher; conscious of his ills, and accurate in his analysis of them, yet uncomplaining; his mind dominating his body till the very end, when he went to sleep as peacefully as a child.

A LIST OF DR. BIGELOW'S CONTRIBUTIONS TO  
MEDICAL LITERATURE.

Manual of Orthopædic Surgery. Boylston Prize Dissertation. Boston, 1845.

Fragments of Medical Science and Art. An Address delivered before the Boylston Medical Society. Boston, 1846.

Insensibility during Surgical Operations, produced by Inhalation. Boston Medical and Surgical Journal, 1846.

"Bowditch's Young Stethoscopist." Boston Medical and Surgical Journal, 1846.

On a New Physical Sign, — a Clicking in the Throat. Boston Medical and Surgical Journal, 1847.

Anæsthetic Agents, their Mode of Exhibition and Physiological Effects. Transactions of the American Medical Association, 1848.

Ether and Chloroform: a Compendium of their History, Surgical Use, Dangers, and Discovery. Boston Medical and Surgical Journal, 1848.

On the Employment of a New Agent in the Treatment of Stricture of the Urethra. Boston Medical and Surgical Journal, 1849.

A Lecture Introductory to the Course in Surgery. Boston, 1849.

Dr. Harlow's Case of Recovery from the Passage of an Iron Bar through the Head. The American Journal of the Medical Sciences, 1850.

Notes from Clinical Lectures on Surgery. Boston Medical and Surgical Journal, 1850-51.

Stellate Crack of the Radius at the Wrist. Boston Medical and Surgical Journal, 1858.

Science and Success. A Valedictory Address delivered to the Medical Graduates of Harvard University. Boston, 1859.

Leucocythæmia. Boston Medical and Surgical Journal, 1860.

A new Anæsthetic: Kerosolene. Boston Medical and Surgical Journal, 1861.



Surgical Cases and Comments. Boston Medical and Surgical Journal, 1864.

Rhigolene, a Petroleum Naphtha for producing Anæsthesia by Freezing. Boston Medical and Surgical Journal, 1866.

Periosteal Reproduction of the Condyles of the Humerus after Excision of the Elbow Joint. Periosteum of the Forehead transplanted in a Rhinoplastic Operation. Boston Medical and Surgical Journal, 1867.

Ununited Fracture successfully treated; with Remarks on the Operation. Boston Medical and Surgical Journal, 1867.

Nitrous Oxide Gas for Surgical Purposes in 1848. Boston Medical and Surgical Journal, 1868.

Address at the Dedication of the Ether Monument in the Public Garden of the City of Boston. City of Boston Document No. 101. 1868.

Practical Views of the Treatment of Fractures and Dislocations of the Elbow Joint, and on the general Impropropriety of Passive Motion. Boston Medical and Surgical Journal, 1868.

The Mechanism of Dislocation and Fracture of the Hip. With the Reduction of the Dislocations by the Flexion Method. Philadelphia, 1869.

Cleft Palate. Boston Medical and Surgical Journal, 1869.

Luxations of the Hip Joint. Boston Medical and Surgical Journal, 1870.

Anæsthetic Inhalation. Boston Medical and Surgical Journal, 1870.

Medical Education in America. Address before the Massachusetts Medical Society. Boston, 1871.

Death by Chloroform, and Alleged Death by Ether. Boston Medical and Surgical Journal, 1872.

Alleged Death from Ether. Boston Medical and Surgical Journal, 1873.

The History of Anæsthesia. New York Times, 1873.

The History of Anæsthesia. New York Tribune, 1873.

Turbinated Corpora Cavernosa. Boston Medical and Surgical Journal, 1875.

The True Neck of the Femur: its Structure and Pathology. Boston Medical and Surgical Journal, 1875.

A History of the Discovery of Modern Anæsthesia. A Century of American Medicine. Philadelphia, 1876.

New Methods in the Treatment of Exstrophy of the Bladder, and of Erectile Tumors. Boston Medical and Surgical Journal, 1876.

On Dislocation of the Hip. The Lancet, 1878.

Lithotrity by a Single Operation. The American Journal of the Medical Sciences, 1878.

Rapid Lithotrity with Evacuation. New York Medical Record, 1878.

Litholapaxy. The Lancet, 1878.

Litholapaxy. The Lancet, 1879.

Litholapaxy. Boston Medical and Surgical Journal, 1879.

Litholapaxy. Boston Medical and Surgical Journal, 1879.

Litholapaxy. New York Medical Record, 1879.

Litholapaxy. Boston Medical and Surgical Journal, 1879.

Litholapaxy ; or Lithotrity with Immediate Evacuation. Transactions of the Clinical Society of London, Volume XII., 1879.

The Modern Art of promoting the Repair of Tissue. Boston Medical and Surgical Journal, 1879.

Litholapaxy. An Improved Evacuator. Boston Medical and Surgical Journal, 1880.

Litholapaxy. Boston Medical and Surgical Journal, 1880.

The Code of Ethics of the Massachusetts Medical Society. Boston, 1880.

Modern Lithotrity. Transactions of the International Congress of Physicians and Surgeons. London, 1881.

Litholapaxy. Boston Medical and Surgical Journal, 1882.

Lithotrity with Evacuation. Boston Medical and Surgical Journal, 1882.

Radical Cure, without Operation, of a Large and Inflamed Umbilical Hernia. Boston Medical and Surgical Journal, 1882.

A Case of Disease of the Liver. Boston Medical and Surgical Journal, 1882.

A Simplified Evacuator for Litholapaxy. Boston Medical and Surgical Journal, 1883.

Fees in Hospitals. Boston Medical and Surgical Journal, 1889.

An Old Portrait of a Surgeon. Boston Medical and Surgical Journal, 1889.

ACTION OF THE COUNCILLORS OF THE MASSACHUSETTS MEDICAL SOCIETY.<sup>1</sup>

THE President of the Society, AMOS H. JOHNSON, M. D., of Salem, addressed the Council as follows : —

“Upon the death of a member of this Society, ordinarily it is contrary to custom to take formal action in order to express our high esteem for his character and services. This fact makes it possible for us to bestow exceptional tributes when they are due. It also suggests that we should not neglect to confer the highest honor in our power upon those who have distinguished themselves, and our profession, by the pre-eminent value of their contributions to medical knowledge and practice.

“The name Bigelow, upon the roll of those who have been members of this Society, is a greatly prized heritage. Dr. Jacob Bigelow was the Treasurer of the Massachusetts Medical Society for the five years from 1823 to 1828. He was its President for the five years from 1842 to 1847. As its Orator, in 1835, he delivered that memorable address, on ‘Self-limited Diseases,’ which marked the renaissance of medical practice. Dr. Henry J. Bigelow proved worthy to bear his father’s honored name. Although, seemingly, he had less breadth and depth of classical learning, and less serious earnestness of character, his varied gifts, his originality and skill as a surgeon, his tact, clearness, and grace as an instructor, placed him conspicuously high in the esteem, nay, in the proud regard, of all members of our profession. Thrice, namely, in 1861, 1862, and 1864, our Society honored itself by inviting him to preside as Anniversary Chairman, and in 1871 to deliver the Annual Address. It is unneces-

<sup>1</sup> Boston Medical and Surgical Journal, February 19, 1891.

sary for me to particularize in order to illustrate to this Council the thoroughness, usefulness, and originality of his work.

“Some of you will remember that during our Civil War General McClellan visited the Massachusetts General Hospital. Few of us will forget the scene in the operating-room in the rotunda, when Dr. Bigelow introduced the popular General to the students then filling the seats, and called his attention to many interesting circumstances ;—among them to the facts that the first operations under anæsthesia from ether had been there performed, and that the sponge shown to him was the first upon which ether had been administered. As the Professor, with his native elegance of form and bearing brightened by his enthusiasm, stood side by side with the uniformed General who had attracted to himself the honor and hopes of a nation, one could not but compare the services to mankind rendered by the two men; and in the widely extending relief of suffering, and the rescue of thousands of lives, through the brilliant, far-reaching work of the Professor, find reason to accord him honors even greater than those won by the Commander in Chief of the Union armies.

“There is an old proverb that ‘to lucky men good fortune will come even when they are asleep.’ But not thus came eminence and honor to Dr. Bigelow. True, he was born into the advantages arising from his father’s learning, and high social position, and his father’s high professional reputation ; but history shows that such circumstances by no means insure success. They tempt to a life of luxurious leisure amid the entertainments of literature and art, at the same time that they furnish a vantage ground on which to commence scientific work. With such favoring helps a son may only rise to a tolerably respectable standing and usefulness, which may then appear all the smaller in value from its contrast to the higher attainments of the father. According to the testimony of those who best knew him, Dr. Bigelow’s eminence, like all real eminence, was the due reward of industry and hard work.



At the beginning of his career he was armed cap-a-pie for the battle of life with weapons of finest temper, and with armor highly wrought, flexible, and strong, but his achievements were won by the spirit and activity of the man bearing such equipments. Ambition, enthusiasm, perseverance, work, reinforced and made fruitful his genius. His versatile talents were actively employed, and the product of their combined power was the great quickness of apprehension, fertility in resources, and facility and grace in manipulations, for which he was remarkable. The Massachusetts Medical Society honors itself in bringing a tribute of admiration of his work and gratitude for his services. In so doing we direct attention to a high standard of professional zeal and surgical skill, which to approximate involves most commendable industry. While to equal the rank to which a gifted nature, large opportunities, and spirited labors elevated Dr. Bigelow must be the rare fortune of exceptionally endowed men. Yet great as were his genius and acquirements they do not so unapproachably lead the surgical profession to-day as in the generation when completeness of medical and surgical training was less common. His example is sure to be, nay, is even now, emulously followed. His many pupils, who form all stages of professional life, look out upon the future of medical learning and practice, and we all, as we think of those taken from our number since last we met, may use the words of Tennyson :

‘Men, my brothers, men the workers, ever reaping something new ;  
That which they have done but earnest of the things that they shall do :  
Yet I doubt not through the ages one increasing purpose runs,  
And the thoughts of men are widened with the process of the sun.  
Knowledge comes, but wisdom lingers, and I linger on the shore,  
And the individual withers and the world is more and more.’ ”

DR. T. H. GAGE, of Worcester, said : —

“ Mr. President, I rise for the purpose of making a motion ; but I trust it will not seem to my associates here presumptuous, if, before submitting it, I detain them for a single word

suggested by the very impressive official announcement which has just been so appropriately made from the chair.

“To the great body of Dr. Bigelow’s pupils and personal friends in the profession throughout the Commonwealth, his death was sudden and unexpected. Few such were prepared by any previous knowledge of his illness for the intelligence of his death, and the announcement when it came was to most a painful surprise. He had been more generally and favorably, and perhaps familiarly, known to the physicians and to the people of Massachusetts than any other medical gentleman of his time. Both the profession and the laity had recognized and appreciated his learning, his wisdom, and his skill, and had been accustomed to regard him as a consultant, in surgical cases of unusual gravity, perplexity, or doubt, whose opinions were entitled to the highest respect, and whose conclusions and decisions scarcely admitted of appeal. Educated and intelligent persons in all parts of the Commonwealth, and of every calling and all professions, had regarded him with interest and admiration, not only as an accomplished man of science, but as a citizen whose eminent services in promoting the welfare and happiness of the people by the alleviation of human suffering had contributed to the honor and the glory of the State. His students, the young and the old, scattered in all the villages and towns from the mountains to the sea, those who had enjoyed the teachings of his later and maturer years, and those whose privilege it had been to sit under his instructions when the glow and enthusiasm of youth and early manhood were upon him, had preserved faithfully in their hearts the spirit of loyalty to their great preceptor, sentiments of affectionate regard and respect for his person and his welfare, and an interest, which was almost filial in its nature, in the honors and the fame that had come to him. Thus, when the painful and unlooked for intelligence was flashed along the wires that Dr. Bigelow was dead, the sensation produced was wide-spread and profound. The hearts of those who had known and admired him, and of those who had been accustomed to turn to him in times of

emergency for assistance and advice, were moved, as they would be rarely moved except in the presence of some general and great calamity. And I do not fear that I shall lay myself open to the charge of exaggeration if I say that, as the melancholy tidings passed rapidly from one to another, over the State, the spontaneous and kindly expressions of sentiment and appreciation with which they were accompanied, all unpremeditated and impromptu as they were, constituted in themselves an appropriate and a beautiful tribute to the services and the character of the distinguished person whose unexpected removal had called them forth.

But, as the first and more immediate impressions produced by the great shock passed away, these informal and desultory expressions of sentiment and feeling to which I have alluded gave place, as befitted the subject, to more studied, dignified, and carefully considered utterances. The sad event was, with great propriety, made an occasion of special and studiously prepared commemorative action in various medical organizations, learned bodies, and public institutions with which Dr. Bigelow had been connected. Very distinguished members of the medical profession, and eminent civilians who had known him all his life, and some whose good fortune it had been to share his acquaintance within the charmed circle of his intimate friends and associates, thus had opportunity to bear appreciative and eloquent testimony to the great qualities of character and the marvellous skill he had so conspicuously displayed. And the strong and salient features of both were faithfully and lovingly delineated.

But, Mr. President, it remains for the Councillors of the Massachusetts Medical Society to take some action; and, under the rules fixing the times of holding their meetings, the present occasion affords them their first opportunity. That it will be the unanimous wish of those who are present to avail themselves of it, and to improve it by preparing for their records some suitable memorial of their late distinguished associate and friend, may be, I presume, taken for granted; and to facilitate such a purpose I move you, sir,



that a committee of three be appointed by the President to prepare and report a form of action, expressive, in their judgment, of the sense of the Councillors upon this occasion, and suitable, if adopted, to be entered upon the record of this day's proceedings."

The motion was seconded with remarks by Dr. Z. B. ADAMS, of Framingham, and thereupon adopted.

The President appointed Drs. GAGE, ADAMS, and DRAPER as a committee, who presented the following memorial, which was unanimously adopted:—

"The Councillors of the Massachusetts Medical Society receive with the deepest sorrow the official announcement of the death of Dr. Henry Jacob Bigelow, and avail themselves of the earliest opportunity to place upon their records an expression of their great respect for his character, and their high appreciation of the services rendered by him to the Society which is here represented, and to the medical profession.

"That Dr. Bigelow was one of the most accomplished surgeons and eminent teachers of his time is the unanimous verdict of his contemporaries, and that his relative place in history will be the same seems equally assured. The great practical achievements with which his name has become imperishably associated have in them permanent and enduring qualities, and will bear his fame to future generations. So long as, and wherever in all the wide world, a human sufferer in the hour of sorest need experiences the merciful alleviations of anæsthesia, or the surgeon approaches the management of vesical calculus or luxation of the hip joint with the confidence and courage born of the new and better methods, so long and so universally will the name of this distinguished surgeon and great benefactor of the race be remembered with gratitude and spoken with admiration.

"Dr. Bigelow's long and useful connection with this body is recalled with most agreeable associations. His participations



in its proceedings have always influenced results, and contributed to the general welfare. No Fellow of the parent Society has been more faithful as a Councillor than he.

“Of gracious, dignified, and noble presence, wise, witty, sententious, and direct of speech, eloquent, courageous in debate, yet courteous to opponents, the memory of his service here will be an enduring pleasure.”

ACTION OF THE MEDICAL FACULTY OF  
HARVARD UNIVERSITY.<sup>1</sup>

THE Medical Faculty of Harvard University desires to enter in the records its appreciation of the eminent services rendered by the late Henry Jacob Bigelow to the Medical School, with which he was connected as Professor of Surgery and Professor of Surgery Emeritus for more than forty years.

Remarkably gifted by nature, his talents were made unusually productive and useful by his intense devotion to the work of the moment, only ceasing with the successful accomplishment of the task.

His lectures were models of condensed thought and applied knowledge, and were delivered with an aptness of diction and a richness of illustration which made them ever memorable.

As a member of the Faculty he was distinguished for the ripeness of his judgment, the wisdom of his conclusions, and the clearness and force of his arguments. Whether as advocate or opponent he was sure to add new light to the subjects under discussion, and was always to be recognized as a leader of men.

His late and last communication to this Faculty showed a benevolent and beneficent interest in the continued welfare of the School.

<sup>1</sup> Boston Medical and Surgical Journal, November 6, 1890.

RESOLUTIONS OF THE MEDICAL BOARD OF THE  
MASSACHUSETTS GENERAL HOSPITAL.<sup>1</sup>

At a meeting of the Medical Board of the Massachusetts General Hospital, December 5, 1890, Drs. Homans, Beach, and Cabot, a Committee appointed by the Surgical Staff, submitted the following remarks and resolutions:—

“Dr. Henry Jacob Bigelow was for forty years one of the visiting surgeons of this Hospital. He was a man of wonderful mechanical skill and touch. Inheriting a remarkable intellectual power and coolness from his father, well taught by opportunities for observation and cultivation, of which he made the most, he entered on the practice of surgery perfectly equipped. Hampered in no way, neither by want of means nor by serious ill health, and endowed with an almost intuitive perception of what was the proper course in every case, he never hesitated. No other result but success in his profession was possible. It was assured by his natural abilities, his unfailing instinct, and his cultivated judgment.

“In the mechanical execution of a preconceived and thoroughly thought out plan of operation, he was superior to other operators, and was as certain as he was graceful, brilliant, and daring.

“Dr. Bigelow’s life was coincident with the discovery of anæsthesia by ether, of which he was one of the leading advocates. He himself contributed one of the greatest discoveries of all, that of a knowledge of the mechanism of the hip joint, a knowledge which enables us to reduce a dislocation rapidly, painlessly, mercifully, and intelligently. This discovery alone was enough to immortalize him, but in his later years he added another practical benefit to surgery and

<sup>1</sup> Boston Medical and Surgical Journal, December 18, 1890.

humanity, namely, his method of relieving those suffering with stone in the bladder. And it will be noticed that all his inventions, achievements, and improvements were practical, and, one might say, manual.

“How thorough he was in perfecting a mode of procedure before he introduced it! He never published until he was absolutely certain, and could demonstrate his method in an almost offhand way. And then how concise in his writings! Not an extra word; every sentence concentrated down to its alkaloid, as one might say. And it must always be remembered that it was in this Hospital that the intelligent reduction of the dislocation of the hip by Dr. Bigelow’s method was first demonstrated, and that it was in this Hospital that the crushing and removal of a stone from the bladder at one sitting was first practised, — an operation to which Dr. Bigelow gave the name of ‘litholapaxy.’

“The code of ethics submitted by him to the Massachusetts Medical Society, and which was adopted, is simply to be a gentleman, to treat others as we would be treated; that is the sum and substance of it.

“His familiarity with the science of mechanics, with the use of tools, and with the engraver’s art supplemented his tactical skill as a surgeon, and rounded out and perfected the clear, concise and brilliant articles he published. His native city and country are proud of him, and suffering humanity will forever be relieved by the inventions of our late associate visiting surgeon as long as the world shall exist. Therefore, —

“*Resolved*, That by the death of Dr. Bigelow the Hospital has lost a friend whose interest in its success as a great charity was ever active and devoted;

“That, through his extraordinary skill in operating and teaching, and the rare judicial character of his investigations in weighing the evidence of disease, standards of work have been established at the Hospital that have contributed much to the advancement of the art of surgery and the comfort of the afflicted;



“That his accomplishments in the art of treating hip joint dislocations and stone, now adopted throughout the civilized world, have distinguished his name among the leading surgeons of his time ;

“That the entire surgical staff, who have without exception been his pupils, tender this acknowledgment in grateful remembrance of one whose first instinct was to save.

‘*Si monumentum quæris circumspice.*’”

ACTION OF THE TRUSTEES OF THE MASSACHUSETTS GENERAL HOSPITAL.<sup>1</sup>

"THE brilliant contributions of the late Dr. Henry J. Bigelow to surgical science entitle him to rank with the great surgeons of the world, and it is especially appropriate that the Massachusetts General Hospital should perpetuate the remembrance of his service of forty years upon its surgical staff, a service which contributed so much to the relief of human suffering, and gave the Hospital a wide-spread renown. It was here, in 1846, that, with enthusiasm and courage, he took a leading part in the first demonstration of the anæsthetic property of sulphuric ether, a discovery which later made possible his method of reducing the dislocation of the hip joint, and again his ingenious treatment by litholapaxy. It is no exaggeration to say that these improvements in surgery have made his name illustrious among the benefactors of mankind.

"It is therefore *Voted*, (1) That the operating-room of the Hospital be hereafter designated as 'The Henry J. Bigelow Operating Theatre,' and the resident physician is instructed to have this name inscribed upon its walls. (2) That the Secretary be instructed to communicate the foregoing vote to Dr. William S. Bigelow, with the request that he will allow the trustees to have made a copy of one of the portraits of his father, to be placed in the Henry J. Bigelow Operating Theatre, in order that the pupils of the Medical School in coming years may be stimulated by his achievements to a more thorough devotion to the noble profession which they have chosen to make their own."

<sup>1</sup> Annual Report of the Massachusetts General Hospital for the Year 1890.

ACTION OF THE SURGICAL SECTION OF THE  
SUFFOLK DISTRICT MEDICAL SOCIETY.<sup>1</sup>

*Resolved*, That we feel that by the death of Dr. Henry Jacob Bigelow the surgical profession in America has lost its brightest light.

His acute discernment and inventive genius made contributions to the surgical art which have put mankind deeply in his debt, and have won the undisguised admiration of his peers through all countries.

We, his associates and scholars, know too his inspiration as a teacher, whose genius so illumined his subject that what might have been dry detail was endowed with interest and fixed indelibly in the memory.

Conscious of the high gifts and genius of Dr. Bigelow, we wish to place upon our records a mark of our appreciation of what he was, and what we owe him.

<sup>1</sup> Boston Medical and Surgical Journal, November 27, 1890.

## RESOLUTIONS OF THE BOYLSTON MEDICAL SOCIETY.

*Resolved*, That the Boylston Medical Society express their deep regret at the death of their former President and most distinguished member, Dr. Henry J. Bigelow. In him not only this Society, but the medical profession in America, has lost its brightest light.

To the students of the School in which he was Professor, the example set by him of untiring zeal in the search for truth will ever serve as an inspiration to loftier effort. His genius, which enabled him to discern and emphasize the essential, distinguished not only his original work, but his clinical teaching.

Great as were his achievements in the scientific and practical side of medicine, the relief of human suffering was the main object of all his study and practice.

He will be remembered not only by those who were personally associated with him, but also by the far larger circle of those who knew him by reputation, because of the additions which he made to surgical procedure. His influence will be felt even where his name may be unknown, whenever a dislocation of the hip is reduced or a stone crushed by the lithotrite.

December 19, 1890.



FROM THE BOSTON MEDICAL AND SURGICAL  
JOURNAL.

. NOVEMBER 6, 1890. EDITORIAL.

HENRY JACOB BIGELOW, M. D., died at his country house in Newton, on Thursday, October 30th, at the age of seventy-two.

For the last few years Dr. Bigelow has been subject to gastric disturbances and attacks of hepatic colic, and for several days before his death his stomach refused to retain food. A post-mortem examination showed the presence of gall-stones, and an inflammation of the common duct, which had extended to the smaller bile-ducts, and was attended with the formation of several small abscesses of the liver. There was also a fibrous stenosis of the pylorus and a slight consequent dilatation of the stomach. The pulmonary affection which was the cause of a temporary abandonment of his medical studies in his early manhood had left its traces at the apices of his lungs.

Dr. Henry J. Bigelow was born in Boston on March 11, 1818. He was the son of Dr. Jacob Bigelow, who left a name distinguished in the profession and by many acts of public benefit. He prepared for college at the Boston Latin School, and graduated at Harvard in the class of 1837. His medical studies, which were pursued with his father and at Harvard, were interrupted by ill health, and a consequent trip to Europe. His medical degree was taken in 1841. He immediately returned to Europe, where he passed three years in the further study of his profession, a greater part of this time being spent in Paris. After his return to Boston he was, in 1845, appointed Instructor in Surgery in the Tremont Street Medical School, succeeding Dr. Reynolds. This position he held until this school was united with the Medical School of

Harvard University. In 1846 he was appointed Surgeon to the Massachusetts General Hospital. In 1849 he was appointed Professor of Surgery, the two chairs of Surgery and Clinical Surgery, previously held respectively by Dr. J. C. Warren and Dr. George Hayward, being united.

A few months after his appointment as Surgeon to the Hospital, ether was first used in the hospital amphitheatre for surgical anæsthesia. Dr. Bigelow was one of the first to see the value of the discovery, and he was specially influential in extending the use of anæsthesia in surgical operations. It was chiefly through his paper on the subject that the knowledge of the wonderful discovery was made known.

Dr. Bigelow's writings have not been voluminous, but as contributions to surgical knowledge they have completely changed surgical practice in several particulars. His interest in anæsthesia and anæsthetics has been repeatedly shown by various articles on ether, nitrous oxide, and on rhigolene, a petroleum naphtha for producing anæsthesia by freezing. The famous case of Dr. Harlow's of the passage of a crowbar through the head was made known chiefly through Dr. Bigelow's interest and study of the case. His work on "Dislocation of the Hip Joint" has banished the old pulleys and rings for its adjustment from the operating theatre.

His Litholapaxy has revolutionized the treatment of stone in the bladder, and given rise to a literature that far exceeds in volume the united writings of its famous inventor.

But the mere enumeration of his writings fails to show the great influence of the man. He had a unique way of regarding all subjects that attracted his notice. The hospital with which he was connected shows, in many places, his originality and inventiveness. Acute, clear-sighted, and inventive as he was, he was capable of most close and severe study. The hard work which he bestowed upon the mechanism of the hip joint extended over several years. His operation of litholapaxy and the instruments for its performance were the result of painstaking labor.

As a teacher he had the power of impressing himself upon his pupils, and of leaving in their minds a sentence or a few words that contained the truth he wished to convey.

He resigned his Professorship in 1882, and his connection with the Massachusetts General Hospital in 1886. During the succeeding years he has led a quiet life, for the most part at his country house, where he has taken great interest in the pursuits of a country life, and in these details he has shown the same marked individuality that characterized his surgical career.

## FROM THE LONDON LANCET.

NOVEMBER 29, 1890. EDITORIAL.

By the death of Dr. H. J. Bigelow, which we briefly recorded last week, America has lost one of her most distinguished surgeons, and a man who has left an indelible mark on the progress of the science and art of surgery. He died at a ripe age, and for several years had retired from active practice. Latterly he had devoted attention to other branches of science than surgery, and had not paid a visit to Europe, as was his habit, for many years. By many of us his handsome person, his courtly manner, and his enthusiasm will never be forgotten, and we shall feel that one tie with our professional colleagues in America is snapped now that Dr. Bigelow is with them no more. For many years he was not only Surgeon to the Massachusetts General Hospital and Professor of Surgery in Harvard University, but a ruling spirit in both of these great institutions, and his counsels largely controlled their course. In the University he was for many years a colleague of Dr. Oliver Wendell Holmes, and between the Professors of Anatomy and Surgery there was a very close personal friendship. In the hospital he was associated with the Warrens, father and son, Hovans, and many other surgeons and physicians of great fame. Himself possessed of ample private means, he was able to give full scope to his strong taste for research and for the application of mechanical principles to surgical methods. In this field he reaped a rich harvest, and particularly in two directions. The first work which brought him European fame was a brochure on the hip joint, in which he described what is now always called by the name he gave it, — the Y ligament. He also pointed out the influence this ligament has in determin-



ing the position of the femur when the caput femoris is dislocated, and that relaxation of this ligament is the key to reduction of a dislocation of the hip by manipulation. This book contains accurate descriptions of the common and the rarer forms of hip dislocations, with simple and clear directions for their reduction by gentle manipulations instead of by brute force, the method at that time universally employed. His statements as to the ease with which reduction could be effected by properly directed movements seemed incredible to those who had witnessed the great difficulty often met with when extension by pulleys was resorted to. But experience has borne out all Dr. Bigelow's assertions: the pulleys have become obsolete, and the surgeon approaches a case of recent dislocation of the hip with as much, if not more, confidence in his power of quickly and easily reducing it as he does that of a finger. Dr. Bigelow devoted some years to the investigation of which this has been the outcome; by it he effected a revolution in this branch of surgery which will always take a high place among the many brilliant surgical achievements of the latter half of the nineteenth century. Of late years his name has been more associated with the operation of lithotrity. To him belongs the credit of greatly widening the scope of this operation, and at the same time of largely lessening its danger and shortening the duration of the treatment. He was the first to grasp the importance of two great facts, and to deal adequately with them. These facts are, first, the ease and safety with which much larger instruments than those then in general use can be passed along the urethra; and, secondly, that one chief danger and drawback in Civiale's operation was the leaving behind in the bladder sharp fragments of stone to be passed in the stream of urine. He therefore enlarged and strengthened the lithotrite, enabling it to crush larger stones, and after crushing he extracted the fragments by means of large tubes and a powerful evacuator. He demonstrated that the bladder and urethra could stand even very prolonged use of these instruments without serious ill results, and he advocated his method as a

universal substitute for the repeated short sittings then in vogue. As before, his statements were received with incredulity, not to say ridicule, and the discussion for a time waxed hot, but we need only add that with Bigelow lay all the honors of it, and that to him belongs the undivided credit of having developed the operation of lithotrity to its present perfection. It is true that others knew of the great extensibility of the urethra, and some may have suspected its tolerance of prolonged instrumentation, while Crampton and Clover had made feeble and largely ineffectual efforts to extract the débris after crushing. It was Bigelow, however, who grasped the idea of "lithotrity at one sitting," or complete evacuation of a calculus at once, as generally applicable, and to him belongs the credit of the one great advance in this operation made since the days of Civiale. Bigelow's name will always be associated with these two operations, and to have added so largely as he did to the simplicity and safety of grave surgical procedures falls to the lot of very few men. When last the present writer saw him, he was busily engaged in studying ants, and his house in Beacon Street, Boston, was largely given over to colonies of these insects. He had devoted a good deal of study to Japanese art, but in this he was followed and out-distanced by his son. Dr. Bigelow's early life was darkened by a great sorrow, but he found much happiness in his constant activity and in the remarkable success that attended his researches.

## FROM THE BRITISH MEDICAL JOURNAL.

NOVEMBER 22, 1890. EDITORIAL.

THIS eminent surgeon, who died at his country house in Newton, Massachusetts, on Thursday, October 30th, aged seventy-two, was the son of Dr. Jacob Bigelow, and his wife, Mary, daughter of Colonel Scollay, of Boston. The founder of the American branch of the family was John Bigelow, who emigrated from Suffolk in the early part of the seventeenth century, and was married at Watertown, in 1642, to Mary Warren, this being the earliest marriage found in the records of that town. His male successors were very long lived. The first in descent died aged eighty-six; the second, seventy-eight; the third, seventy-three; the fourth, eighty-three; the fifth, seventy-four; and the sixth, Dr. Jacob Bigelow, died at Boston in 1879, aged nearly ninety-two. This Dr. Jacob Bigelow was a great physician and scholar. He wrote a life of the famous Count Rumford, some pamphlets on classical subjects, numerous medical essays, and, best known of all, a fine "American Medical Botany." He passed nearly the whole of his long life, holidays and professional journeys excepted, in the city of Boston.

Professor Bigelow was destined, like his father, to live and to reap fame as a Boston man. He was born in Boston on March 11th, 1818. In 1837 he graduated at Harvard, having been educated as a boy at the Boston Latin School. He then fell ill with symptoms of phthisis, and had to cease for a time his medical studies; on recovery he travelled in Europe, and returned, taking the degree of M. D. in 1841. He then set out once more for Europe, and studied for three years, chiefly at Paris. In 1845 he was appointed Instructor in Surgery in the Tremont Street Medical School. In 1846 he was ap-

pointed Surgeon to the Massachusetts General Hospital. In 1849 he was elected Professor of Surgery in Harvard University. Dr. Bigelow was one of the earliest promoters of anæsthetics. He enjoyed the advantage of a fair independent income, and was an indefatigable worker, who took up subjects with enthusiasm. The highest proof of his versatility lies in the fact that his name is known to every student and surgeon as an authority on two very different questions, dislocations of the hip and the treatment of vesical calculus.

In 1869 appeared his "Mechanism of Dislocation and Fracture of the Hip, with the Reduction of the Dislocations by the Flexion Method." His theory and practice, ripened and justified by experience, are familiar to all practical surgeons, and the illustrations are fast displacing the well-known and time-honored drawings of reduction of hip joint dislocations by pulleys. Professor Bigelow expressed in this work his belief that the period was not far distant when longitudinal extension by pulleys to reduce a recent hip luxation would be unheard of, and that prophecy is coming true. He did not actually discover the method of reducing dislocations of the hip by manipulation without pulleys; indeed, in the case of dislocation upwards and backwards, the rule, "Lift up, bend out, roll out," had long been known in London schools of medicine. Professor Bigelow, however, rendered the practice scientific by demonstrating the anatomy and pathology of the injury in question, and showing how the ilio-femoral ligament might be utilized as an essential mechanical agent in the reduction of all forms of dislocation of the head of the femur.

Professor Bigelow reaped yet greater fame in the field of lithotrity. In January, 1878, an article by Professor Bigelow, "On Lithotrity by a Single Operation," appeared in the American Quarterly Journal of the Medical Sciences. This paper was shortly followed by a separate work on the same subject. Professor Bigelow had devised a new method of performing lithotrity, to which the name "Litholapaxy" was given. The object was to remove the stone, however large, at a single operation. An evacuation apparatus, adequate to



the purpose in view, was contrived, and the operation proved satisfactory in practice. The inventor based his new operation on Professor Otis's researches, which proved that the urethra was more freely dilatable than was usually supposed. Litholapaxy requires instruments of somewhat large calibre, to which, however, owing to the dilatability of the urethral canal, there is no real objection. Litholapaxy was strongly assailed in this country when Professor Bigelow's work first appeared; nor can the opponents of the deceased surgeon be blamed for looking at first with distrust on any modification of so grave a proceeding as lithotrity. The very principle of safe evacuation of a stone at one sitting seemed too good to be true, which, in the case of an innovation in surgery, often means that it would practically prove bad and dangerous. Amongst the earliest defenders of litholapaxy in this country was Mr. Reginald Harrison, who was present on April 6th, 1878, at the Massachusetts General Hospital, when Professor Bigelow removed a large uric acid calculus by his new method. In August, 1878, Mr. Harrison reported to the Surgical Section of the British Medical Association at Bath what he had seen, and exhibited Dr. Bigelow's instruments for the first time in England.<sup>1</sup> Since that date, the operation has become established in this country.

Professor Bigelow was an able and popular teacher, an active practical man, and a deep student. He greatly impressed European visitors to his hospital; and the result of his labors gained for him the confidence of the profession all over the civilized world. To be associated with three things so important as the introduction of anæsthetics, the simplification of the reduction of dislocated hip joints, and an important improvement in lithotrity, is indeed a sufficient claim to fame. Perhaps the greatest evidence that a surgeon has gained the confidence of teachers is when his name is diffused through students' text-books. Such has been the fate of Professor Bigelow. Who does not know his drawing of the Y ligament, and the sketch of a surgeon in the act of

<sup>1</sup> British Medical Journal, vol. ii., 1878, p. 280.

reducing a dislocated hip joint? Who has not heard of Bigelow's litholapaxy as one of the operations under the head of "Treatment" in the chapter on vesical calculus in current educational works on surgery?

Professor Bigelow was one of the American delegates to the International Medical Congress which met in London in 1881. He retired from the General Hospital in 1886, and lived thenceforth in his country house. There he devoted himself to rural pursuits and agricultural questions with the same energy that had distinguished him during his professional career. He suffered much, however, from dyspepsia and hepatic colic. At length he sank from uncontrollable vomiting. A necropsy was made, and gall stones, with inflammation of the ducts, small abscesses in the liver, fibroid stenosis of the pylorus, and dilatation of the stomach were discovered. The apices of the lungs showed signs of old disease.

## FROM THE INDIAN MEDICAL GAZETTE.

CALCUTTA, FEBRUARY, 1891. EDITORIAL.

INDIA is under a special debt of gratitude to this great American surgeon, who died on the 30th of October, at the age of seventy-two. The introduction of Litholapaxy, or "Lithotrity at a single sitting," with complete evacuation of the débris, has revolutionized the treatment of stone in the bladder, and effected a great saving of human suffering and life. It is to Bigelow and to him alone that we owe this great and beneficent innovation, and India, in many parts of which stone is so prevalent, promises to profit by it in a very special manner. Therefore it is that we consider a brief notice of the life and work of the distinguished inventor of litholapaxy becoming and proper. Bigelow studied medicine under very favorable circumstances. After completing his curriculum in America he proceeded to Europe, and studied in London, Paris, and elsewhere, for the purpose of adding to his knowledge, and acquiring by observation and study what was best at the time in European medical science and art. Two years were spent in this pursuit, and he returned to his native city of Boston, and applied himself with assiduity and success to the business of his life. He held office as Surgeon to the Massachusetts General Hospital from 1846 to 1886, a period of forty years, and occupied the Chair of Surgery in Harvard University from 1849 to 1882, a period of thirty-three years. Possessed of ample private means, he devoted himself to the work of his profession and chair with enthusiasm and vigor, and kept himself in touch with men and work in Europe by frequent visits to England and the Continent. He was a man of fine presence, grand physique, good intellect, strong character, and varied attainments. The Boston Society for

Medical Improvement held a special memorial meeting on the 19th of November, at which a series of orations were delivered by eminent medical men, — Hodges, Wendell Holmes, Henry Lee, Cheever, and others, — in which full justice was done to his disposition, genius, and work. The resolution unanimously adopted by the meeting summarized his character and attainments in the following sentences: "Possessed of unusual surgical perception, quick insight, great technical skill and dexterity, clearness and directness as a teacher and writer, he added to these the qualities of leadership, an unusual intelligence, and an indomitable persistence in whatever investigations he undertook. His achievements have won for him a place among the foremost surgeons of his time, and his works have benefited humanity."

Among the numerous outcomes of his busy life, which was occupied with art and natural history as well as with pathology, there are three results of his ingenuity and industry which stand out prominent, and which constitute his main claim to a niche in the temple of fame. He was largely, if not mainly, instrumental in introducing anæsthesia in America. What Simpson did for chloroform in Edinburgh, Bigelow accomplished for ether in Boston. His researches in dislocations of the hip joint revolutionized the treatment of these serious injuries, and introduced into practice the method of reduction by manipulation, a system which requires good knowledge of the anatomy of the parts and the pathology of the lesion, and has been made applicable to dislocations elsewhere. His third achievement was the discovery of litholapaxy, and those who have read this journal for the last ten years need not be told how great and good an invention this was.

The greatest men, whose lives have been full of thought and work, rarely succeed in leaving behind them more than a few permanent monuments of their industry and skill, and Bigelow is no exception to this rule. But the usefulness of a life is to be measured not so much by the few striking achievements which serve to perpetuate the name of their author as



by the manner in which a man fulfils his place in life, and the measure in which by continual well directed effort he aids in helping on the cause of humanity and truth. In this respect Bigelow was not wanting, and the speeches to which we have referred indicate a man of strong purpose and intelligent energy, who lived a life of labor and usefulness, and contributed thereby materially to human welfare and progress.

His success in surgery was largely due to one circumstance, which has always entered very largely into the work of every successful surgeon, namely, that he laid the foundations of his practical developments upon a close study of anatomy and pathology; and this, we conceive, constitutes the chief lesson of his professional career.

## FROM THE BOSTON DAILY ADVERTISER.

OCTOBER 31, 1890.

HENRY JACOB BIGELOW, M.D., LL.D., who held a leading rank among the most prominent surgeons in the United States, died at his summer home in Newton yesterday afternoon. Dr. Bigelow was the son of Jacob Bigelow, M.D., LL.D., and was born in Boston, March 11, 1818. He received his early training at the Boston Latin School. Having completed his preparatory course here he entered Harvard College, from which he graduated with the class of 1837. Under his father's direction he now began the study of medicine, attending also the regular medical course at Harvard. At the end of three years, his health being impaired, he went to Europe, but returned in 1841 to receive the degree of M. D.

The newly fledged physician went back to Europe immediately after receiving his diploma, and remained there three years, a greater part of the time being spent in Paris. He visited other important centres of medical instruction on the Continent and in Great Britain. Having returned to Boston, he was, in 1845, appointed a teacher of surgery in the Tremont Street Medical School, succeeding to the vacancy caused by the resignation of Dr. Reynolds. This position he held until the school was merged with the Medical School of Harvard University. In the spring of 1846 he was appointed Surgeon to the Massachusetts General Hospital, and he maintained a connection with that institution for a long number of years.

In 1849 the nearly simultaneous resignation by Dr. J. C. Warren and Dr. George Hayward of the surgical professorships then held by them in Harvard University created a

vacancy to which, after a union of the teaching in the various departments of surgery and clinical surgery under a single professorship, Dr. Bigelow was appointed. For a period of nearly twenty years he filled this chair without an assistant.

A few months after his becoming connected with the Massachusetts General Hospital the first public experiments in the administration of ether to produce anæsthesia during surgical operations took place in that institution. The important part played by Dr. Bigelow in these early experiments, and the fact that he made the original announcement of the discovery of modern anæsthesia in a paper published in November, 1846, linked his name permanently with the history of this great benefaction to humanity.

As a writer Professor Bigelow's influence has been far reaching and effective. Apart from addresses, etc., his contributions to medical science have all contained distinctly new and important matter. One of his works, an octavo volume (illustrated), on the "Mechanism of Dislocations of the Hip, and their Reduction by the Flexion Method," published in 1869, is the best treatise extant on these injuries. It has changed the modes of practice in respect to them, and is well known to the medical profession. He has been a copious contributor to the literature of his profession, and, in addition to his eminent scientific attainments, possessed a grace of language and elegance of illustration which rendered interesting the driest details of the healing art.

Among the other more important of his papers and addresses, the following may be mentioned: "Fragments of Medical Science and Art," an address delivered before the Boylston Medical Society of Harvard University in 1846. "Insensibility during Surgical Operations, produced by Inhalation," read before the Boston Society for Medical Improvement, November 9, 1846, an abstract having been previously read before the American Academy of Arts and Sciences, November 3. "Discovery of Anæsthesia: Ether and Chloroform; a Compendium of their History, Surgical Use, Dangers, and Discovery." "Anæsthetic Agents, their

Mode of Exhibition and Physiological Effects," written at the request of a committee of the American Medical Association, and reprinted from the Transactions of that body in 1848.

Other articles written by him are "Alleged Death from Ether," "Centennial Article on the History of Anæsthesia," "On the Employment of a New Agent in the Treatment of Strictures of the Urethra," "On a New Physical Sign," "Rhigolene, a Petroleum Naphtha for producing Anæsthesia by Freezing," "New and Successful Operation for Ununited Fracture," "Fractures and Dislocations of the Elbow Joint," "Practical Views on the General Impropriety of Passive Motion," "An Introductory Lecture," delivered at the Massachusetts Medical College in 1849, "Notes from Clinical Lectures on Surgery," delivered at the same place in 1851, "Science and Success," a valedictory address delivered to the medical graduates of Harvard University in 1859, "Medical Education in America," the annual address delivered before the Massachusetts Medical Society in 1870, Dislocation of the Hip," "Litholapaxy, or Lithotrity with Evacuation," "The True Neck of the Femur, its Structure and Pathology," "Turbinated Corpora Cavernosa," and "New Methods and Treatment of Exstrophy of the Bladder and of Erectile Tumors."

Dr. Bigelow's attainments in medical science have won for him membership in leading American and European societies, among which are the American Academy of Arts and Sciences, and the Société Anatomique, the Société de Biologie, and the Société de Chirurgie of France. Dr. Bigelow leaves a sister, and one son who is himself a prominent physician in this city.



## FROM THE BOSTON EVENING TRANSCRIPT.

OCTOBER 31, 1890.

DR. HENRY JACOB BIGELOW, the eminent surgeon, died at his summer home, Oak Hill, Newton, yesterday, at the age of seventy-two. Dr. Bigelow was a native of Boston, and a son of the famous Dr. Jacob Bigelow. He graduated at Harvard in 1837, and at the Medical School in 1841, going to Paris to complete his education. In 1846 he was appointed Surgeon to the Massachusetts General Hospital. In 1849 he was made Professor of Surgery in the Harvard Medical School, a position he held for thirty-three years, until the celebration of the one hundredth anniversary of the School, retiring then at the same time that Dr. Oliver Wendell Holmes retired from the Professorship of Anatomy. When he left the chair, the title of Professor Emeritus was bestowed upon him, while the presentation to the University, by friends of Dr. Bigelow, of a bust of the retiring official brought to this School a tangible mark of the esteem which all knew existed in the hearts of associates and scholars. On that occasion Dr. Holmes paid a warm tribute to his associate's achievements, saying: "I witnessed many of the experiments by which the great surgeon who lately filled a chair in Harvard University has made the world his debtor. Those poor remains of mortality, of which we have heard so much, have been of more service to the human race than the souls once within them ever dreamed of conferring. Dr. Bigelow's repeated and searching investigations into the anatomy of the hip joint showed him the band which formed the chief difficulty in reducing the dislocations of the thigh. What Sir Astley Cooper and all the surgeons after him had failed to see, Dr. Bigelow detected. New rules for the reduction

of dislocations were the consequence, and the terrible pulleys disappeared from the amphitheatre. Still more remarkable are the results obtained by Dr. Bigelow in the saving of life and the lessening of suffering in the new method of operating for calculus. By the testimony of those renowned surgeons, Sir Henry Thompson and Mr. Erichsen, by the award to Dr. Bigelow of a sexennial prize founded by the Marquis d'Argenteuil, and by general consent, this innovation is established as one of the great modern improvements in surgery. I saw the numerous and patient experiments by which that priceless improvement was effected, and I cannot stop to moan over a scrap of integument, said to have been made imperishable, when I remember that for every lifeless body which served for these experiments, a hundred or a thousand living fellow creatures have been saved from unutterable anguish, and many of them from premature death."

During his years as an instructor Dr. Bigelow taught some eighteen hundred students who were graduated at the School, besides about seventy-five hundred more who were graduated elsewhere. He also published a number of surgical works which have gained for him a wide-spread reputation. The bent of his mind in this direction was shown by his "Manual of Orthopædic Surgery," a dissertation which obtained the Boylston Prize for 1844. Dr. Bigelow's method of rapid lithotritry is of still greater value. In 1882 the French Academy of Medicine awarded the eminent Boston surgeon the Argenteuil Prize, following in this bestowal of laurels upon Dr. Bigelow the precedent set by the International Medical Congress in London several years before. Harvard bestowed its mark of honor in conferring the degree of LL. D. in 1882, and in the passage of the resolution by its Medical Faculty in 1883, recognizing "the great loss sustained in the retirement of Dr. Bigelow, whose keen observation, accurate research, and rare genius in discovering new and important methods of operative procedure have done so much to render this School conspicuous, and to make American surgery illustrious throughout the world." . . . His

position as Surgeon of the Massachusetts General Hospital was retained until 1886, when he resigned. The Trustees, in accepting his resignation, appointed him Surgeon Emeritus, and placed at his disposal five of the hospital beds. Clear-headed and cool in every emergency that arose in his profession, brilliant and energetic, and, above all, commanding great knowledge and accuracy, he continued his long career with eminent success, and gave to science much additional information that will long serve to keep his name honored by scientists, and blessed by those whose sufferings will be alleviated by his patient research.

## FROM THE BOSTON POST.

NOVEMBER 1, 1890.

THE death of Dr. Henry J. Bigelow will be learned with regret, not only in this country, but in Europe, where he had a higher reputation than any American surgeon on account of the remarkable inventions and discoveries by which he had added so materially to the resources of surgical science. Indeed, it will not do to narrow his achievements to the limits of his profession, because they were in a direct sense benefactions to humanity. It has been given to few men in this or any other age to have contributed so much to the alleviation of human suffering, and this in a permanent manner. The instruments and methods by which he conferred such a priceless boon upon his race survive him, and they will do for future generations what they have done for his own. In this respect he has the advantage over the mere operator, however skilful, whose work perishes with him; when the cunning hand and nimble brain have been laid to rest, they cease to have any fructifying influence beyond that which comes from the direct personal associations of their owner. Few men indeed combine, as Dr. Bigelow did, the accomplishments which distinguish these different types of men and make permanent additions to the stock of surgical science, while exhibiting a skill in professional practice which is the admiration of trained observers.

Our great Boston surgeon was in his seventy-third year at the time of his death, but he looked much younger, for he had that physical grace and alertness that do so much to conceal the advance of age. He was one of the best preserved men of his time of life in this city, and as he walked along the street his elastic step and easy manner made him appear



younger than many of his juniors. The fact that 1837 was the year of his graduation at Harvard makes one realize that he had reached advanced years, especially as so many of his classmates are no longer among the living. . . .

Dr. Bigelow came naturally by his professional talents, according to the law of heredity, — which, however, does not always act so directly as in his case, — his father, the late Jacob Bigelow, having been distinguished for his abilities, which, like those of his son, were exercised in the domain of scientific discovery as well as of medical practice. His remarkable paper on “Self-limited Diseases” and his distinction as a botanist illustrated his scientific eminence, and he was probably the most variously learned of American physicians. He died at the great age of ninety-two, having lived to witness the splendid achievements of his son.

It has been said that the appreciation of foreign nations is a sort of anticipation of the verdict of posterity, and Dr. Bigelow was fortunate in having won the highest honors from the most illustrious authorities of Europe. The prize awarded to him by the French Academy of Medicine was a testimonial of which any man might have been proud. His operation of rapid lithotrity, which has done so much to lessen the danger of the removal of calculus, has been acknowledged by Sir Henry Thompson and other leaders of the profession to be one of the greatest improvements in modern surgery. There is a satisfaction in knowing that Dr. Bigelow's services to science were rendered here in Boston in connection with his services at the Medical School of Harvard University, and at the Massachusetts General Hospital. The recollection of the honors conferred upon him a number of years ago on the occasion of his retirement from these posts of duty after a long period of faithful service is a fragrant one.

Dr. Bigelow was a man of artistic temperament and tastes, and his official services in connection with the Museum of Fine Arts emphasized this aspect of his nature. It was easy to see, indeed, in the grace with which he handled the knife,

in the ease with which his most difficult operations were performed, that a sense of artistic skill underlay the profound knowledge which he brought to the execution of his work. I have often thought that the praise bestowed upon the skill of Liston might as appropriately have been applied to him, — that he could operate as skilfully with an oyster knife as with the best product of the cutler's art.

My recollection of Dr. Bigelow goes back to the days when he lived in a house in Chauncy Place, which was then a quarter for modest, quiet dwellings, and I recall the stylish professional cart which he used to drive, which contrasted strikingly with the huge chaise, with its immense hood, that his father, who lived near the head of Summer Street, had made one of the sights of Boston in that day. The example which our great surgeon leaves of devotion to science, by which he conferred so much benefit upon humanity, will, I trust, stimulate our young physicians and surgeons to broaden their outlook upon the profession, and thus to increase its benefits to the world.

## FROM THE BOSTON HERALD.

OCTOBER 31, 1890.

DR. HENRY JACOB BIGELOW, a surgeon whose skill has given him the highest rank in professional circles the world over, and whose fame will ever be one of Boston's glories, died at his summer home, Oak Hill, Newton, shortly before noon yesterday. He had been suffering for many weeks from an ailment of the stomach and liver, and the rapid inroads of the disease upon a constitution that had baffled the storms of over seventy years could not be checked. His demise had been fully expected by his medical advisers, and did not come as a sudden shock to the immediate members of his family, — a sister and a son.

Dr. Bigelow practically finished his distinguished professional career when, in February, 1886, he withdrew from his position as Surgeon of the Massachusetts General Hospital. The Trustees of that institution then conferred upon him the honorable title of Surgeon Emeritus. Two years prior to that he had resigned the Chair of Surgery in the Harvard Medical School after thirty-three years of onerous service, and on the honor list of that educational establishment was designated Professor Emeritus.

In taking up the medical profession Dr. Bigelow followed in the footsteps of his father, who in his day stood at the head of his school in Boston, and probably in America. He graduated at Harvard in the class of 1837, and, after studying at the Medical School and taking his degree of M. D. in 1841, went to Paris to complete his professional education. The French metropolis was then the centre of medical science, and in the schools and hospitals of the gay capital the young Boston student laid broad and deep the

foundations of his professional culture. He returned home after several years of study, and soon made his mark, even in a city which had been adorned by the ability and learning of such eminent medical men as John Collins Warren and James Jackson. He did not, however, confine himself to the routine of professional work, but took a broad view of the duties and responsibilities of his position. This was shown in an address which he delivered in 1846 before the Boylston Medical Society of Harvard University, of which he was President. In this production he took a bold stand in behalf of the higher functions of the medical profession as the promoter of advanced science. He vindicated the uses of the imagination in research, and maintained that hypothesis in some form is almost essential to the discovery of scientific truth. In this and in later addresses he gave wise counsel to aspirants for success with the scalpel, and showed them the fallacy of the idea that the great surgeon is known chiefly by his skill in the operating amphitheatre: "Do not identify surgery with the knife, with blood and dashing elegance. Distrust surgical intrepidity and boldness. The province of surgery is to save and not to destroy, and an operation is an avowal of its own inadequacy." These words may sound strangely from the most brilliant operating surgeon that Boston has known, but they have all the more force as coming from him, and they show how early he recognized the true functions of the profession.

It is worthy to note, also, that Dr. Bigelow was one of the first to discern the value of ether as an anæsthetic. When the memorable demonstration was made by Dr. Morton at the Massachusetts General Hospital in the autumn of 1846, Dr. Bigelow was foremost in spreading the great discovery, and his pen was the first to emphasize its importance. . . .

Dr. Bigelow published a number of surgical works which have gained for him a wide-spread reputation. In 1869 he published an important work entitled "The Mechanism of Dislocation and Fractures of the Hip, with the Reduction of the Dislocations by the Flexion Method." It is in this



branch of surgery that Dr. Bigelow has won some of his brightest laurels, by the discovery of the anatomical causes which had rendered previous modes of treatment so prolific in human suffering. . . . Of still greater value is Dr. Bigelow's method of rapid lithotrity, by which, in a single operation, stone in the bladder is removed with greater safety and with less resulting suffering to the patient than by any other system. He made valuable contributions to the medical journals regarding his method, and he had a controversy about it with the great English surgeon, Sir Henry Thompson, who finally acknowledged its superiority. The value of this invention was recognized throughout the civilized world. The French Academy of Medicine awarded to him the Argenteuil Prize in 1882, but before that time the profession had given the tribute of its admiration.

It is natural that Harvard University should have conferred upon the great surgeon her highest honors, and the degree of LL.D. in 1882 was a not inappropriate tribute to the future Professor Emeritus, whose knowledge of the laws of nature entitled him to another doctorate than that of medicine.

## FROM THE BOSTON DAILY GLOBE.

OCTOBER 31, 1890.

DR. HENRY J. BIGELOW, who died at his summer residence in Newton last night, had wide fame. Few surgeons in America have been able to command an equal rank with him. Clear-headed and cool in every emergency that arose in his profession, brilliant and energetic, and above all commanding great knowledge and accuracy, he continued his long career with eminent success, and gave to science much information that will long serve to keep his name honored by scientists and blessed by those whose sufferings will be alleviated.

Born in Boston, March 11, 1818, he graduated at Harvard in 1837, having as classmates the late Richard H. Dana, Henry D. Thoreau, John Weiss, Dr. William J. Dale, formerly Surgeon General, W. W. Greenough, Joseph Gales Seaton of the "National Intelligencer," Charles Theodore Russell, Rev. David G. Haskins, Judge Nathaniel Holmes, of Missouri, author of an essay identifying Shakespeare with Bacon, Judge Samuel Treat, and the late Professor John Bacon. After a few years' study at the Medical School, from which he graduated in 1841, Dr. Bigelow went to Paris to complete his professional education. His return home was soon signalized by the attainment of a marked position among the physicians of the city. His father, Dr. Jacob Bigelow, in his day stood at the head of his profession, and the son was not lagging in following such an example.

In 1846 he was appointed Surgeon to the Massachusetts General Hospital. That same year an address of his, delivered before the Boylston Medical Society of Harvard University, of which he was President, shows that the young surgeon

had already taken a broad and advanced view of his profession, and in subsequent publications he gave no little instruction to the world on various topics, writing always with a vigorous pen, pointed by happy illustrations and directed by thorough knowledge. . . . He was a practical teacher, possessing the power of explaining and discussing facts in a clear and pointed manner, and being able at all times to draw upon almost unlimited resources of information in his mind. His treatment of hospital cases, also, was so skilful and able, that scholars could learn the highest perfection in his diagnoses and treatments. . . .

Everywhere in the circles of his profession Dr. Bigelow has been known, and an instance of the fame about his name may be shown in mentioning the gathering of nearly all the leading surgeons of New York at the Academy of Medicine in that city to listen to his words when he lectured before that institution by invitation of its President. . . .

His entire career has been one of highest honor to himself and greatest usefulness to mankind, and the closing of his long years of helpfulness will cause regret and sorrow among hundreds of patients, friends, and associates.

## FROM THE BOSTON EVENING JOURNAL.

NOVEMBER 1, 1890.

THE last scene in the record of the great surgeon, Dr. Henry J. Bigelow, who in the course of half a century had imparted instruction to nearly ten thousand pupils, and had won fame for the character of American scientists in the Old World, took place at Trinity Church at one o'clock this afternoon, evoking an assemblage of noteworthy men representing his profession which has rarely been surpassed in a single grouping. There were gathered the remarkable men who had been associated with him in professional life, the notable Harvard class of 1837, the students who had grown up to manhood since his tuition, and those who represented the Massachusetts General Hospital, with which his name and great abilities had been so prominently connected. Of those outside of professional life there were many who recalled, with something more of a personal than an abstract recognition, the boon which he had conferred upon suffering humanity by permitting the use of anæsthetics, and by intercepting, through the fruits of his patient research, so much of the pain that had before been linked with surgery.

The Massachusetts General Hospital was represented by President Charles H. Dalton and members of the Board of Trustees. Among others present were Dr. Oliver Wendell Holmes, Treasurer Edward W. Hooper of Harvard College, Dr. A. Coolidge, Dr. Fitz, Mr. W. S. Dexter, Mr. W. W. Greenough, Dr. H. H. A. Beach, Hon. Roger Wolcott, Mr. Edmund Dwight, Dr. Samuel A. Eliot, Mr. and Mrs. F. R. Sears, Mr. J. Arthur Beebe, Mr. Abbott Lawrence, Mr. Thomas Motley, Hon. Charles Theodore Russell, Dr. Morrill Wyman, Mr. William Minot, Mrs. J. F. Andrew and mem-



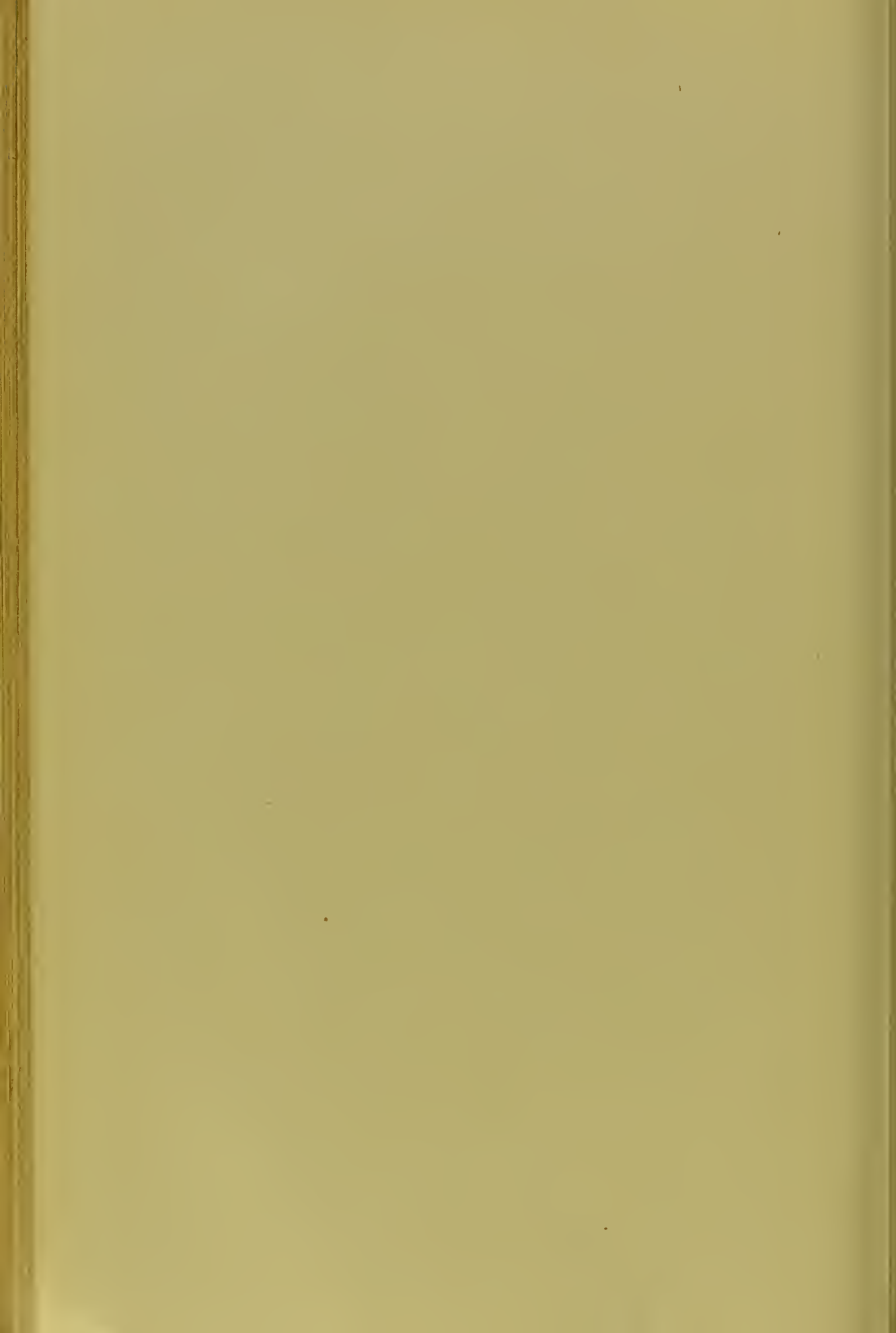
bers of the Thayer family, Mrs. John Cushing, Mr. and Mrs. C. S. Sargent, Mr. F. B. Balch, Colonel Henry Lee, Dr. Samuel A. Green, Mrs. G. Howland Shaw, Mrs. William C. Wharton, Mr. C. P. Curtis, Mrs. Henry Bryant, Mr. Edward N. Perkins, Mr. Henry Bigelow Williams, Mr. Martin Brimmer, Hon. and Mrs. Henry Cabot Lodge, Mrs. J. L. Gardner, and Mr. Charles Welch.

The seating of the gathering was conducted by Dr. George West, Dr. W. D. Hodges, Dr. A. T. Cabot, and Mr. Arthur Dexter. By request no floral testimonials were sent, a single wreath of ivy being placed upon the casket.

As the remains were borne up the main aisle, the Rector of Trinity, Rev. Dr. Phillips Brooks, entered at the head, reciting the opening words of the Episcopal service, "I am the resurrection and the life." In keeping with custom, no words of eulogy were spoken. There were no pall bearers, and the remains were conveyed for private interment to Mount Auburn Cemetery.



## APPENDIX.





## APPENDIX.

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### I. — PAGE 58.

*Letter to the Trustees of the Massachusetts General Hospital, on the Occasion of Dr. Bigelow's Resignation.*

TO THE TRUSTEES OF THE MASSACHUSETTS GENERAL HOSPITAL : —

GENTLEMEN, — Having, at the expiration of forty years' service, in pursuance of an intention I have for some time entertained, resigned my position as Surgeon, you have done me the honor to appoint me to the office of Emeritus Surgeon of the Massachusetts General Hospital, without a vote in the Medical Board.

I am aware that this is the first time in the history of the Hospital this honor has been conferred, and I am very grateful to you for the compliment. But although during the whole of my professional life the Hospital has been one of my few permanent interests, and will continue to be so, and although, as long as I felt convinced that I was of service to the Hospital, I was reluctant to sever my connections with it, there are reasons which compel me with regret to decline the honor.

Whoever accepts the place of Emeritus Surgeon, with the privilege of using the beds of the Hospital, yet without a vote in the Board of Physicians and Surgeons, especially if this limitation is made at the expressed wish of members of that Board, would naturally be expected to confine his attention to the sick under his care. He would cease taking the greater

and active interest in the general welfare of the Hospital which before had been his duty. He might even have to remain a mere spectator, while still feeling a certain responsibility for what he did not approve. On these grounds I have decided to carry out my design, and give up all connection with the institution.

Will you permit me, in leaving, to call your attention to a few considerations connected with the internal administration of the Hospital, all the bearings of which may not be evident to those who are not familiar with them practically. Were the late Dr. Whittemore still alive, I should think this unnecessary.

The Hospital at present is in a state of great efficiency, due to its excellent management for a series of years, and to the thorough and wise discipline maintained by its late admirable Superintendent, supported in no doubtful manner by the Trustees. Its traditions and its charities are at this moment as clean as are its walls and floors. Never have its usefulness and its reputation been greater than now. For forty years there has been no friction in its working. Trustees and staff have always co-operated to the same disinterested ends. And this would naturally last so long as all questions of personal and private interest were banished, as heretofore, from any connection with the Hospital.

The recent differences have been due to a gradually increasing divergence of views in the Board of Physicians and Surgeons. Some of its members desire to see introduced into the Hospital certain new features, which, although they might prove advantageous to some members of the Board, others object to, on the ground that any such measures are injurious to a charitable institution. It is a familiar fact, for example, that some members of the staff have a desire to use the institution as a home for their private patients, and in that way make it contribute to their professional emolument. In my opinion, any such change, however plausibly introduced, will inaugurate for the Hospital an era of decline. Another measure relates to the continued attendance of the surgeons out of

their regular term of service. If this practice is once established, besides leading to confusion in the duties of the house officers and attendants, and otherwise impairing the discipline of the Hospital, it will in time, through the repeated admittance of private patients of members of the staff, inevitably bring with it the question of the payment of fees directly or indirectly for medical or surgical attendance. Other measures may be mentioned; one, making Sunday a regular operating day, to the great inconvenience of the attendants of the house; and recently another, reducing the number of surgeons to four, instead of six, the number heretofore. I have thought it best for the Hospital to oppose all these measures.

Knowing that of late years continued vigilance has been needed in the Board of Physicians and Surgeons to prevent the initiation of any such changes, I believe that the same vigilance will now be needed on the part of the Trustees. The institution has incurred no obligation to those upon whom it has bestowed the professional distinction and the great professional advantages of its medical offices. Its Trustees should weigh carefully any measure which would tend to confuse the administration of a great public charity with the promotion of private interests, or subordinate its general discipline to private convenience. I am confident that a clear expression of the views of the Trustees upon these subjects would be of great advantage, for there should be no misapprehension about them.

Again thanking you, gentlemen, for the honor you have done me, and with my best wishes for the continued prosperity of the Massachusetts General Hospital,

I am respectfully yours,

HENRY J. BIGELOW.

February 18, 1886

## II. — PAGE 96.

## LITHOTRITES.

*Instructions to Collin et Cie., Instrument Makers, Paris.*

THE one sent is too large in the stem and round the instep, which is generally the largest part.

I want one nearly as large as this, and two smaller ones, making three sizes. The *smallest* to be about the usual *medium* size.

I want the instruments at the *biggest part* (to be determined by a string of fine wire put round the irregular mass), respectively, of the equivalent eircular sizes (*filière* Charrière) 26, 28, 30.

All my instruments are larger and stronger than usual. Collin must judge of the strength of the material, and make the whole strong enough to resist the power of the ball handle, which has the same diameter as his wheel.

BALL. — This is a light hollow sphere of metal. This makes it easier to the hand, and does not add to the hand the power of Collin's wheel (which you want to avoid, lest you break the jaws). Perhaps he will make the ball in two hemispheres.

The top should have a buried nut of some sort with the serew thread in the *usual* direction (not reversed, as Collin makes his).

LOCK CYLINDER. — This is destined for the thumb and finger of the right hand, and is just long enough for that purpose.

The NEW LOCK, etc., is to avoid raising the thumb of the left hand in order to shut the loek at the eritical moment of securing the fragment. This is the first time this has been



done, and is, I guess, the best way to do it. It is locked with the right hand, while the left remains immovable.

For this purpose the guard revolves. Its long bars are narrow, and slide in slots in the lock cover, and turn the latter to lock it. (The slots and bars should be *deeper* than the model, for strength and security; but they *cannot* be *wider*, lest they strike the female screws in revolving.)

LOCK. — This has two female spring screws, as usual; but to close these, it has, inside the cover, a *double* wedge.

1st, a triangle to act from *below up*, as it turns.

2d, one corner of each screw is rounded, especially below, so as to wedge also, *sideways*. All this makes it go easily. The cap is held on by a bayonet joint, but *cannot be got off* without the key.

To take the cap off: 1st, turn the cap hard forward; 2d, put the key in the top hole *hard*, till it *snaps* on to the springs; 3d, turn the cap hard back, and it will now *drop* over the key.

CAP. — This will be of exactly the same diameter as the long handle, with a bead between them.

BEADS AND MOULDINGS. — All to be handsome, plain, and *artistic*, and different from the stereotyped style of Collin's lithotrites and "resonator" surfaces.

MATERIAL. — All steel and white metal. The brass is only for the convenience of making a model.

ORNAMENTATION. — The *ball* should be *fluted* with *convex* flutes, for looks, and to prevent slipping, unless this will give too strong a *grip* and break the jaws. The protected wheel, projecting from the ball as in the wooden one sent, *hurts* the right hand about as much as the wheel alone. Why not make the *long grip* for the left hand, with longitudinal *convex* fluting like the ball, instead of Collin's "resonator" surface?

The LOCK CYLINDER wants a few convex straight lines on it to catch the right thumb and finger; but the object is to have the whole perfectly soft and easy to the operator's hand and fingers.

JAWS.— This is very important. To make them self-discharging, which with me is an *absolutely essential* point, (i. e. so that *ils ne s'engouent pas*,) the female jaw or shoe is solid metal, with hollow tubing as usual. This makes the floor of the shoe flat and superficial near the slot. The floor has two planes to be considered ; one is *vertical*, and the other *horizontal*.

Most of the *vertical* débris is shoved through a slot by a thick plunger, *well fitted*. The *horizontal* débris escapes laterally, by carefully arranged triangles. These triangles not only comminute, but also pulverize, because the little sharp rim of the female shoe holds the fragments against pressure at 45° by the triangles. Perhaps a sharp longitudinal grooving of the floor would also be good.

Let Collin satisfy himself *carefully* whether my instrument can, by *any possibility, impact* (*s'engouer*). If it does, then it is not what I want, and must be made with steeper triangles. But I think it does not. I send a sample of "No. 2," of another pattern I have tried.

The shoe should be *thin*, with *low sides*, especially at the curve. If high, these sides hinder the fragments from getting on to be crushed.

The shoe should be as *broad as possible*, to hold fragments ; and much *longer* than the stamp, to keep the bladder away. It can be easily introduced, even if long. Have it strong, but make up in breadth, what can be spared from thickness.

The only limit to the breadth is that the combined circumference of the shoe and stamp should not exceed that of the urethra.

INJECTOR.— By which water may be injected through a rubber tube attached to a nose just below the handle behind, whence it passes down by a groove cut in the male blade, to be delivered through the slot in the shoe. But only when the instrument is *shut* ; because only in that position does the stamp rod plug the female blade at the top, so as to hinder the water from escaping up into the handle. Make this plug *water-tight*.

TO WORK THE LITHOTRITE. — Grasp the long *handle* with the *left* hand. Hold the *ball* with the ring and little finger of the *right* hand ; of which the thumb and first two fingers then naturally fall on the lock cylinder and grasp it.

To lock the blades, *turn* the *whole right hand, the ball and lock together*. *Do not let go the ball*, but if the screw sticks turn the ball a little without the lock.

## III. — PAGE 100.

*Letter from Professor Sophocles, of Harvard University, in  
Regard to Nomenclature.*

CAMBRIDGE, June 27, 1881.

MY DEAR DOCTOR, — *Λαπάζω* or *ἀλαπάζω* usually refers to the *sacking, plundering* of a city; of course *emptying* it of its movables; that is, it applies to the thing containing the things *to be emptied*. So that *λιθολάπαξις* would mean the *emptying of stones*, or *purging*. But since you have already used *litholapaxy*, it may not be worth while to alter it into *λιθοκένωσις* (*litho-kenosis*), the verb *κενόω* (*vacuo, evacuo*) applying to the vessel *emptied*, and to the *things emptied*.

The tube may be called *λιθοκενωτήρ* (*litho-kenoter*). It must always be remembered that modern technical terms derived from the Greek do not usually conform to the rules of Greek derivation and composition.

Sincerely yours,

E. A. SOPHOCLES.



## IV. — PAGE 140.

*From the Annual Report of the President of Harvard University, 1881-82.*

“THE resignation of Professor Henry J. Bigelow, after a service of thirty-three years, was an event of great interest for the Medical School and the whole University.

“A discoverer and inventor of world-wide reputation, a brilliant surgical operator, a clear and forcible lecturer, a keen debater, and a natural leader of men by force of activity, ingenuity, and originality, Dr. Bigelow was from the beginning to the end of his connection with the Medical School a very influential member of the Faculty. His energy and sagacity contributed to the rapid growth of the School between 1858 and 1870. During the discussions of 1870-71, in the Medical Faculty and the Governing Boards,—discussions which resulted in important changes of the general plan and policy of the School,—his part was that of a strenuous, uncompromising, and indefatigable opponent of the new projects; but the caution and moderation which his opposition induced the majority of the Medical Faculty to practise doubtless made the measures they finally recommended all the wiser, and therefore the surer to succeed. Dr. Bigelow continued to labor in the School with unabated interest and vigor for ten years after the adoption of the plans which he had opposed. In recognition of his eminent services to the University and the public, Dr. Bigelow was chosen, in May last, Emeritus Professor of Surgery, and the degree of Doctor of Laws was conferred upon him at the last Commencement.”

*Letter accompanying the Transmission of the Diploma of the Degree of LL. D., conferred upon Dr. Bigelow by Harvard University.*

HARVARD UNIVERSITY, November 30, 1882.

DEAR SIR, — I have the honor to send you by this mail the diploma of the degree of Doctor of Laws which was conferred upon you at the last Commencement.

In taking this action the University desired to testify in its traditional way that it appreciated your genius, recognized your professional achievements, and was grateful for your services as a teacher.

Believe me, dear sir, very truly yours,

CHARLES W. ELIOT.

PROF. HENRY J. BIGELOW, LL. D.

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*Report of a Committee of the Board of Overseers, to whom, under the rules, the recommendation of the Corporation of Harvard University to appoint Dr. Bigelow Professor of Surgery, Emeritus, was referred.*

BOSTON, January 22, 1882.

The Committee to whom was referred the communication of the President and Fellows informing the Overseers that they had voted to appoint Henry Jacob Bigelow, M. D., Emeritus Professor of Surgery, in consideration of his many valuable services to the Medical School during the past thirty-three years, beg leave to report as follows:—

Dr. Bigelow's practical wisdom and energy greatly contributed to, and controlled, the progressive steps by which the Medical Department of the University has reached its present high position. His skill in pointing out the most important facts, and in impressing broad generalizations from simple data, peculiarly adapted his instruction to the demands of American Medical Students, and inspired two generations

of them with enthusiasm for their profession. He was one of the first American teachers to insist upon the importance of Surgical Pathology as a study. His far-seeing discernment identified him with, and quickened, the introduction of etherization. By his discoveries he has contributed to the enlargement of medical knowledge; and by his rare faculty of invention he has made brilliant improvements of immediate practical usefulness. Pre-eminent as a surgeon, possessed of varied scientific acquirements, the President and Fellows have justly recognized his services by their vote, and your Committee cordially recommend concurrence therewith on the part of the Overseers.

Signed,

R. M. HODGES.

F. E. PARKER.

R. M. MORSE, JR.

## V. — PAGE 141.

*From The Boston Daily Advertiser, June 9, 1882.*

As will be noticed in the report of the meeting of the Board of Overseers of Harvard College yesterday, the resignation of Dr. Henry J. Bigelow from the Professorship of Surgery was accepted, and his appointment as Emeritus Professor was referred to a committee. Dr. Bigelow has been connected with the Harvard Medical School for thirty-three years, and has attained the chief place among the surgeons of the country. His conclusions from these long years of teaching are, of course, valuable to the public, and yesterday afternoon, after the meeting of the Overseers, he spoke freely of medical matters with a reporter who called on him.

He has seen many changes in surgery, he said, since he became connected with the School, and of these the discovery of surgical anæsthesia was the first. In April, 1846, he became connected with the General Hospital; in October practical etherization was discovered, and it has changed the practice of surgery. He has never performed a serious operation without it. Happening to write the first article on Etherization, he became involved in the early controversy. Wells and Jackson, he said, were within the atmosphere of the discovery, but it was Morton who took the initiative and risk, and carried it through. But for Morton there is nothing to show that we should know anything about anæsthesia to-day.

Perhaps the most important medical subject at this time, said Dr. Bigelow, is the question how far certain minute organisms are the cause of disease, and interfere with healthy processes. Pasteur is the great apostle of this doctrine. Listerism — cleanliness, and the absolute exclusion of decomposition from a wound — is a recent discovery, and marks a



great advance in surgery. Operations are perhaps twice as safe as formerly. The mortality of ovariectomy, by progress in this direction, has been reduced from more than fifty to less than ten per cent.

As to medical education, Dr. Bigelow said that once it was mainly a teaching of theories, but now, in everything, all the world is studying facts, and in medicine the educated man alone is capable of judging facts. The spirit of medical science is often blinded by medical practice. Suffering people are so desirous of being occupied and satisfied, — of being told what cannot be known, and of having something done, — that even the educated medical man sometimes gets to believe in what he is compelled to say and do every day. But science is moving along with the facts, and there is great progress in the knowledge and treatment of most surgical affections. The announcement of a theory is now only an invitation to those best able to judge to examine the facts and see if they support it. Individual views and opinions have very little weight. The best teacher gets his knowledge from the collective and proved experience of others.

As to the Harvard Medical School itself, Dr. Bigelow said: It is a good one. It does not make more exceptionally prominent practitioners and scientists than is the case in other large cities, because prominence comes mainly from inherent qualities; but the average student is better educated here. He must study harder, and pass harder examinations. Studies are so arranged in order and amount that he can have not only all the education he needs, but he must acquire a good deal of it. When the School gets into its new building, the students' opportunities will be still further increased. Dr. Bigelow said that a medical school should govern itself in medical matters. Ours is a little hampered by non-medical influence. Most medical schools in this country are private corporations, managed as commercial enterprises. But here the teachers are salaried, and as a consequence a considerable University fund has been established for the benefit of the School which a private corporation could not have secured.

As an offset to this advantage, the non-medical government sometimes exercises an influence which is not always advantageous.

Dr. Bigelow holds positive opinions about women doctors. Many people believe that a woman may be a good physician, but, as a rule, he thinks they will not belong to the best class of practitioners. The fact cannot be ignored, he said, that the sphere of woman is a domestic one. The growth and education of the human race points to a division of labor and duties between men and women. The tendency of all women laborers is to leave their work and become wives and mothers when they can, and the same will be true of women medical students. A woman physician will always be rather an exception in the community. She meets a want among a few people, and the medical faculty have the utmost good will toward all of them. The want is so limited, however, that the Faculty should not be asked to do anything to cripple their own institution in meeting it. They have all they can do to educate men. They have been making a great sacrifice to raise the medical department to a condition of excellence, and a few people who believe in what is called women's rights are naturally desirous to get a foothold therein. In this case the pressure of a part of the non-medical government of the University has been brought to bear upon the Medical Faculty in behalf of the views of a few persons. The community at large cares little about the matter.

Of the cruelty and necessity of vivisection Dr. Bigelow remarked that, unhappily, some vivisection is necessary to a knowledge of the human frame, but it easily becomes a hideous affair. Enthusiasts in science, as well as in religion, are easily blinded to the sufferings of other beings. Vivisection exists in its most objectionable form in Europe. In England there are so many friends of animals that they are much protected. An active controversy, however, is now in progress there about it. In this country popular opinion on the subject is concentrated in anti-cruelty societies, and is doing good work. Such societies should be sustained. All necessary

vivisection should be done with ether freely used, and pain reduced to a minimum. It is an enormity to say that pain is of no consequence in the advancement of science. In the large laboratories abroad pain is held to be of next to no account. Mere students practise vivisection, without restriction, in experiments of little value, repeating what has been already done, without regard to the infliction of suffering. Here is where the law should intervene. The anti-vivisectionists, so called, in England, unfortunately for their cause, are placing themselves in a false position by opposing painless, or nearly painless experimentation, merely because the subject is a living animal. The administration of fatal drugs, or the inoculation even of a fatal disease, does not necessarily involve pain. The opponents of vivisection are properly only opponents of physical cruelty, — of the methodical infliction of pain, which is sometimes atrocious, to little or no purpose. The subject is somewhat difficult to handle, because, while the progress of knowledge does justify certain experiments, the practice of vivisection, if unrestricted, is barbarous cruelty.

Of the value of specialists in the profession Dr. Bigelow said that important ends are mostly brought about in everything by specialists. The question is mainly how far a subdivision of labor is an advantage. That depends partly on the size of the community. In medicine the specialist sometimes does best; sometimes the general practitioner. The best results are often reached through the combined efforts of both. Certain specialties are of great advantage at medical centres. Specialists know more of detail, but many get to feel that their specialty is as important as the whole field. They habitually see all diseases through it, and as the cure of many local diseases depends upon an amelioration of the general health, here is where the specialist is most likely to be at fault. In any given direction the specialist knows most, but is liable to exaggerate most.

In regard to the present success of Homeopathy, Dr. Bigelow said he was unable to speak. The homeopathy of Hahnemann was beneath contempt, and it exists here only in

name. Modern homeopathy is generally much like other medical practice, really doing nothing when nothing is needed, and using active remedies where they are of service. So far as this is done in the name of homeopathy, it is a misnomer. People should be careful that they employ only well educated practitioners, whatever they profess. In this country it is possible for an able man to practise medicine ignorantly and dangerously, and still to secure proselytes in the first classes of society. Irrational principles have always existed. They had Hydropathy in Ancient Rome. Persons otherwise sensible will pay a quarter of a dollar to see the spirit of a deceased relative. People have a right to their belief in such subjects. Their wisdom, or their ability to judge about such matters, is another question.

Dr. Bigelow here closed the conversation by adding, "I think I have told you all I know."



## VI. — PAGE 158.

A VERY clever German workman, much employed by Dr. Bigelow, says:—

“He came to me with a lock, which was made by the American Lock Co. of New York, which he wanted me to take apart and to examine it. I told him I was a very poor locksmith.

“One day he called me to his house, where I found, to my surprise, a whole bushel of locks of all descriptions. I made some alterations on quite a number of them. He showed me how he could pick some of them without a key. His hand was very sensitive and steady. After working quite a while on locks, he called me one day, and took me down State Street, where I had to do some lock picking in a large insurance office, in presence of about half a dozen gentlemen. I picked one in less than ten seconds, and he was pleased. He took me to the Museum of Fine Arts, for which I did some work under his direction. He was greatly interested in oil paintings. He got up an atomizer with which he could throw oil in a spray. While he was building his house in Newton he got up a window catch which he called burglar proof; also a door fastener.<sup>1</sup> He improved a camera stand for taking pictures. He got up a thermometer holder which he fastened outside of his window.”

<sup>1</sup> The carpenter — a first-rate mechanic — who put this fastener on the door, and tried it two or three times, after his work was done, turned round and said, quietly, “There’s no flies on Dr. Bigelow.”

## VII. — PAGE 178.

THE following account of his acquaintance with Dr. Bigelow was written by Mr. Simon Bertsch, a German, a superior and intelligent artisan, of high personal character, long in the employ of Messrs. Codman and Shurtleff, Surgical Instrument Makers, Boston. Dr. Bigelow held Mr. Bertsch in great regard.

“It was in the year of 1878, or about that time, when I had the honor of getting introduced to Dr. Bigelow by Mr. Shurtleff, with the understanding that Dr. Bigelow could have Bertsch for experimenting on some instruments which Dr. Bigelow wished to get up, or improve. Before the year of 1878, Dr. Bigelow had very little confidence in the American mechanic; he thought there was nothing like the English or French workman in this country.

“At this time Codman and Shurtleff had a branch factory on Bowker Street, up four flights, which he would run up and down, like a deer, or a man of thirty.

“He came most every day, sometimes twice, giving me orders and instructions, which were sometimes very difficult to get over, as Dr. Bigelow was very particular and exact in all his work. He would let nothing pass half done. During the winter of 1878 he did not feel very well, so he had me call to his house, where I received further instructions, at the same time showing him what I had done. After several months' hard work he succeeded in getting just what he wanted. Then he had several sets of instruments made, which he took, the following June, to England, to a Doctors' Convention.

“He had me bring all his instruments to his house, where I helped him to put them together one Sunday. He was very much pleased that day, for everything worked to perfection. He filled two good-sized trunks with them. He thanked me very kindly for my assistance.

“After he returned from Europe, he commenced experimenting again, and made great alterations and improvements.

“By this time Codman and Shurtleff moved their factory to Columbus Avenue, where he was a regular caller once or twice a day, sometimes calling as late as half past five in the evening, very often staying one hour or more to assist me in the work.

“He was the best instructor I ever had. He was a good free hand draughtsman. He was also a good mechanic. He was not ashamed of taking a file or any kind of a tool in his hand and go to work, for he had quite a little workshop at his own house. He had a lathe, jig saw, and a lot of other tools.

“I worked more or less for Dr. Bigelow, till he left the Hospital, on his instruments. Since then I made about eighty sets of them.

“Whenever I worked for Dr. Bigelow, I did the best I could to please him, and minded my own business, as he found out during my twelve or fourteen years experimenting with him.

“Through his death I lost one of the best friends I ever had. He will be always remembered in my family.”













